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AEROSPACE MEDICINE AND BIOLOGY

A CONTINUING BIBLIOGRAPHY

WITH INDEXES

(Supplement 133)

OCTOBER 1974



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AEROSPACE MEDICINE AND BIOLOGY

A CONTINUING BIBLIOGRAPHY
WITH INDEXES

(Supplement 133)

A selection of annotated references to unclassified reports and journal articles that were introduced into the NASA scientific and technical information system and announced in September 1974 in

- *Scientific and Technical Aerospace Reports (STAR)*
- *International Aerospace Abstracts (IAA).*



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INTRODUCTION

This Supplement to *Aerospace Medicine and Biology* (NASA SP-7011) lists 276 reports, articles and other documents announced during September 1974 in *Scientific and Technical Aerospace Reports (STAR)* or in *International Aerospace Abstracts (IAA)*. The first issue of the bibliography was published in July 1964; since that time, monthly supplements have been issued.

In its subject coverage, *Aerospace Medicine and Biology* concentrates on the biological, physiological, psychological, and environmental effects to which man is subjected during and following simulated or actual flight in the earth's atmosphere or in interplanetary space. References describing similar effects of biological organisms of lower order are also included. Such related topics as sanitary problems, pharmacology, toxicology, safety and survival, life support systems, exobiology, and personnel factors receive appropriate attention. In general, emphasis is placed on applied research, but references to fundamental studies and theoretical principles related to experimental development also qualify for inclusion.

Each entry in the bibliography consists of a bibliographic citation accompanied in most cases by an abstract. The listing of the entries is arranged in two major sections: *IAA Entries* and *STAR Entries*, in that order. The citations, and abstracts when available, are reproduced exactly as they appeared originally in *IAA* or *STAR*, including the original accession numbers from the respective announcement journals. This procedure, which saves time and money, accounts for the slight variation in citation appearances.

Two indexes—subject and personal author—are included.

An annual index will be prepared at the end of the calendar year covering all documents listed in the 1974 Supplements.

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All publications abstracted in this Section are available from the Technical Information Service, American Institute of Aeronautics and Astronautics, Inc. (AIAA), as follows: Paper copies are available at \$5.00 per document up to a maximum of 20 pages. The charge for each additional page is 25 cents. Microfiche ⁽¹⁾ are available at the rate of \$1.50 per microfiche for documents identified by the # symbol following the accession number. A number of publications, because of their special characteristics, are available only for reference in the AIAA Technical Information Service Library. Minimum airmail postage to foreign countries is \$1.00. Please refer to the accession number, e.g. A74-10763, when requesting publications.

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GENERAL AVAILABILITY

All publications abstracted in this bibliography are available to the public through the sources as indicated in the *STAR Entries* and *IAA Entries* sections. It is suggested that the bibliography user contact his own library or other local libraries prior to ordering any publication inasmuch as many of the documents have been widely distributed by the issuing agencies, especially NASA. A listing of public collections of NASA documents is included on the inside back cover.

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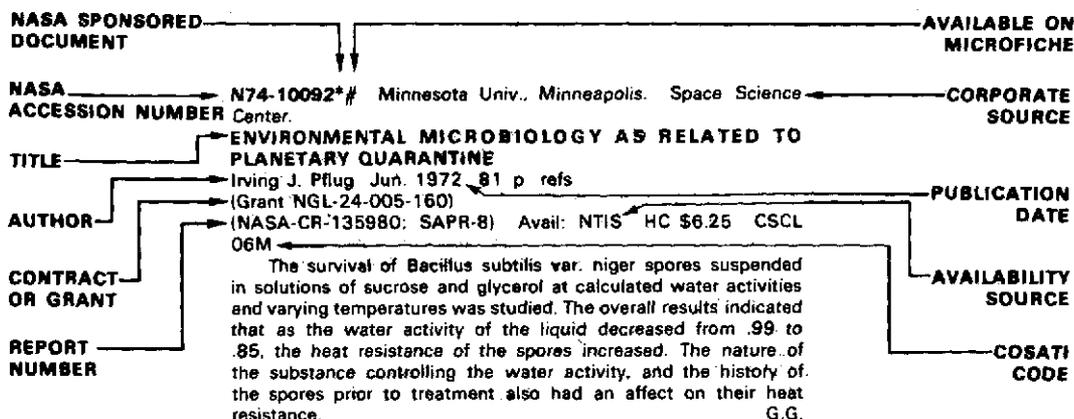
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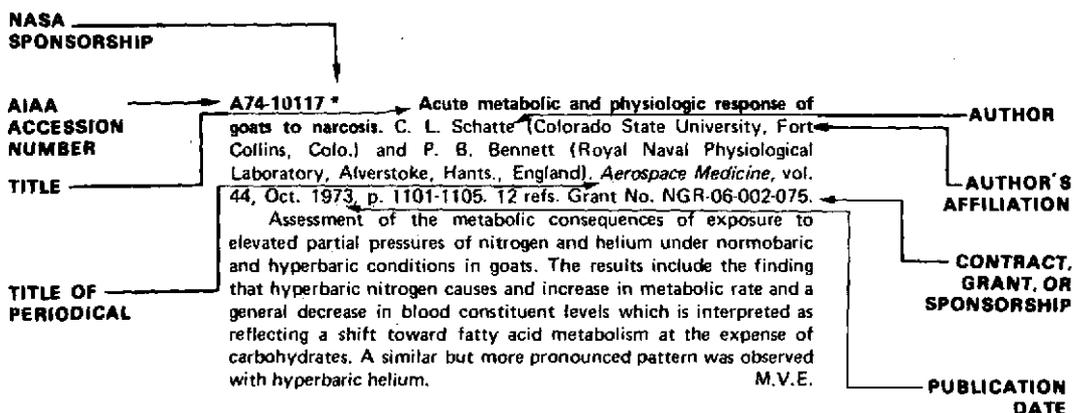
TABLE OF CONTENTS

	Page
IAA Entries (A74-10000)	291
STAR Entries (N74-10000)	309
Subject Index	I-1
Personal Author Index	I-29

TYPICAL CITATION AND ABSTRACT FROM STAR



TYPICAL CITATION AND ABSTRACT FROM IAA



AEROSPACE MEDICINE AND BIOLOGY

A Continuing Bibliography (Suppl. 133)

OCTOBER 1974



IAA ENTRIES

A74-35250 Progress in vestibular modeling. J. H. Ryu, G. M. Lance, and B. F. McCabe (Iowa, University, Iowa City, Iowa). In: Joint Automatic Control Conference, 15th, Austin, Tex., June 18-21, 1974, Proceedings. New York, American Institute of Chemical Engineers, 1974, p. 373-378. 21 refs. Grant No. NIH-NS-06785.

A mathematical model for dynamic characteristics of the horizontal semicircular canal was studied based on measurements of single neural activity in the vestibular nuclei of the cat. The horizontal semicircular canals were stimulated with a constant angular acceleration of 4 deg/sq sec for 25 seconds and the activity of single neurons in the vestibular nuclei were recorded extracellularly using a tungsten microelectrode. A transfer function model was obtained and compared with several other existing models on the basis of transient responses. (Author)

A74-35335 * Brain catechol synthesis - Control by brain tyrosine concentration. R. J. Wurtman, F. Larin, S. Mostafapour, and J. D. Fernstrom (MIT, Cambridge, Mass.). *Science*, vol. 185, July 12, 1974, p. 183, 184. 20 refs. Research supported by the John A. Hartford Foundation; Grants No. PHS-AM-11709; No. PHS-NS-10459; No. NGR-22-009-627.

Brain catechol synthesis was estimated by measuring the rate at which brain dopa levels rose following decarboxylase inhibition. Dopa accumulation was accelerated by tyrosine administration, and decreased by treatments that lowered brain tyrosine concentrations (for example, intraperitoneal tryptophan, leucine, or parachlorophenylalanine). A low dose of phenylalanine elevated brain tyrosine without accelerating dopa synthesis. Our findings raise the possibility that nutritional and endocrine factors might influence brain catecholamine synthesis by controlling the availability of tyrosine. (Author)

A74-35521 Atmospheric homeostasis by and for the biosphere - The Gaia hypothesis. J. E. Lovelock and L. Margulis (Boston University, Boston, Mass.). (*Commission on Atmospheric Chemistry and Global Pollution, Symposium on Trace Gases, Mainz, West Germany, Apr. 2-6, 1973.*) *Tellus*, vol. 26, no. 1-2, 1974, p. 2-10. 19 refs. Research supported by Shell Research, Ltd.

Theoretical and data-supported examination of the hypothesis that the total ensemble of living organisms constituting the biosphere can act as a single entity in the regulation of the overall chemical composition of the atmosphere, surface pH, and, possibly, also climate. The hypothesis is proposed as an alternative to a hypothesis according to which the cycling of gases in the biosphere is a passive process which does not determine the atmospheric composition. V.Z.

A74-35525 # Regional vascular changes after functional loading. V. I. Georgiev and E. V. Kiselkova (Vishh Institut za Fizkultura, Sofia, Bulgaria). *Bolgarskaia Akademiia Nauk, Doklady*, vol. 27, no. 4, 1974, p. 579-582. 10 refs.

Certain regional changes in the blood circulation after physical loading developing the quality of endurance were surveyed. Twenty experiments were carried out in two series, since the rheograph was of the two-channel type. The rheograms taken in one of the series were from upper and lower limbs, while in another series they were from an upper limb and the head. A comparison of the results from the investigated indices of the rheograms from the upper extremities, obtained from the two series of experiments, reveals the interesting fact that in the first series the amplitude of the rheographic wave rises immediately after the physical loading, whereas in the second series it shows a decline. F.R.L.

A74-35564 * Peripheral visual response time and visual display layout. R. F. Haines (NASA, Ames Research Center, Moffett Field, Calif.). In: Society for Information Display, International Symposium and Exhibition, San Diego, Calif., May 21-23, 1974, Digest of Technical Papers. New York, Lewis Winner, 1974, p. 102, 103. 10 refs.

Experiments were performed on a group of 42 subjects in a study of their peripheral visual response time to visual signals under positive acceleration, during prolonged bedrest, at passive 70 deg headup body lift, under exposures to high air temperatures and high luminance levels, and under normal stress-free laboratory conditions. Diagrams are plotted for mean response times to white, red, yellow, green, and blue stimuli under different conditions. V.Z.

A74-35565 The format and color of small matrix displays for use in high ambient illumination. B. Ellis, G. J. Burrell, J. Wharf, and T. D. F. Hawkins (Royal Aircraft Establishment, Farnborough, Hants., England). In: Society for Information Display, International Symposium and Exhibition, San Diego, Calif., May 21-23, 1974, Digest of Technical Papers. New York, Lewis Winner, 1974, p. 106, 107.

Sets of 7 x 5 matrix characters having two different dot-space ratios were used in tests on 125 subjects in a study of the power dissipation on emissive displays with emission concentration onto a series of small bright areas or a more continuous lower-luminance dissipation. Another purpose of the tests was an assessment of relative performances of green and red displays of equal luminance. The results suggest that a 4-mm LED display clearly legible in 100,000 lux should be considered realistic. V.Z.

A74-35673 On electrophysiological activity of the normal heart. P. S. Thiry and R. M. Rosenberg (California, University, Berkeley, Calif.). *Franklin Institute, Journal*, vol. 297, May 1974, p. 377-396. 17 refs.

The heart is divided into eleven components, each being modeled by a dipole of known and fixed location and direction; these dipoles are shown to result from the propagation of the transmembrane potentials over the surface of the myocardial cells. The components of the left ventricular wall are composed of 'Durrer layers', and these in combination with the 'contiguity effect' result in a positive ventricular gradient and T-wave. Electrocardiograms generated by the eleven dipoles yield high-fidelity 12-lead ECGs. (Author)

A74-35700 Clinical problems and stress in air traffic control. A. E. Wagstaff (National Air Traffic Services, London, England). (*Symposium on Stress in Air Traffic Control, Manchester, Victoria University, Manchester, England, Oct. 13, 1973.*) *The Controller*, vol. 13, May 1974, p. 3-6.

Clinical patterns of illness and disease in air traffic controllers follow the patterns seen in the population at large. It is believed, however, that there are lower incidences of illness in controllers because of two reasons, including the selected nature of controllers as a group and the requirement for controllers to undergo a routine medical examination every twelve months throughout their careers. Stress factors are present in air traffic control, as in many other occupations. There is no evidence so far to suggest that these stresses produce undue deterioration in health or illnesses of a specific nature related to the job. G.R.

A74-35839 All-exotic materials used in NASA's Skylab/Space Shuttle crews' bump protective helmets. E. F. Bushman and J. S. Van Haastert (Sierra Engineering Co., Sierra Madre, Calif.). In: New industries and applications for advanced materials technology; Proceedings of the Nineteenth National Symposium and Exhibition, Buena Park, Calif., April 23-25, 1974. Azusa, Calif., Society for the Advancement of Material and Process Engineering, 1974, p. 641-652. 7 refs.

A new high level of fire/smoke/fume/heat safety in personal flight safety equipment has been attained in bump protective helmets

worn by astronaut crews in Skylab and Space Shuttle programs. The shell is polyimide-fiberglass compression molded, the liner is Fluorel foam rubber, the edging is extruded Fluorel-Refset rubber. The adjustable head suspension and chinstrap are polybenzimidazole tape, webbing, and fabric, chin pad is Durette felt; and the sewing thread is Nomex. To avoid atmospheric contamination from flaking paint, the astronaut team specified 'no paint', making as-molded appearance of often porous polyimide a challenge. Following extensive research, polyimide's substantial outgassing during molding and 600 to 700 F postcuring was overcome, yielding glossy, dense helmet shells of specified impact safety. (Author)

A74-35911 * # Transphoresis and isotachophoresis as preparative techniques with reference to zero-gravity. J. O. N. Hinckley (Arizona, University; U.S. Veterans Administration Hospital, Tucson, Ariz.). *American Institute of Aeronautics and Astronautics and American Society of Mechanical Engineers, Thermophysics and Heat Transfer Conference, Boston, Mass., July 15-17, 1974, AIAA Paper 74-664*. 14 p. 44 refs. Members, \$1.50; nonmembers, \$2.00. Contract No. NAS8-29566.

Transphoresis and isotachophoresis are high resolution electrophoretic separation methods for biological materials. They benefit substantially from a weightless environment. Low power consumption and apparatus payload per unit product yield reflect their high electrophoretic efficiency. Properties unique to these systems, including their imposition of self-stabilizing geometry, suggest novel apparatus automatically controllable by largely electrical means with few or no moving parts. Configurations allowing continuous and semicontinuous operation, and further improvement of efficiency, are discussed. (Author)

A74-35988 * Response-produced timeouts under a progressive-ratio schedule with a punished reset option. J. F. Dardano (Johns Hopkins University, Baltimore, Md.). *Journal of the Experimental Analysis of Behavior*, vol. 22, July 1974, p. 103-113. 20 refs. Grants No. NSG-189-61; No. NGR-21-001-069.

An attempt is made to extend the generality of timeouts from positive reinforcement to more complex performances. Pigeons were provided with three continuously available options. Responses on one key resulted in food reinforcement under a progressive-ratio schedule, which requires a larger number of responses for successive reinforcements; responses on a second key, which were shocked, reset the progressive-ratio schedule to its first step; and responses on a third key produced a 3-min timeout. Some of these conditions have

A74-35991 # Time-domain analysis of characteristics of the human operator in a simple manual control system. T. Isobe and H. Kobatake (Tokyo, University, Tokyo, Japan). *Tokyo, University, Faculty of Engineering, Journal, Series B*, vol. 32, Dec. 1973, p. 419-430. 9 refs.

An attempt to find the characteristics of the human operator in a simple manual control system by applying a method of statistical analysis in the time-domain is described. First, the closed-loop system concerned is considered approximately to be a second order system, and its natural period and the damping ratio are determined. Secondly, the gain and the delay of the human controller are estimated on the assumption of the crossover model. The adaptive response of the operator to a change in the controlled dynamics is also discussed by using the same model. (Author)

A74-36130 # Mathematical methods in the study of biological regulatory systems (Matematicheskie metody v issledovanii biologicheskikh sistem regulirovaniia). A. R. Shakhnovich and D. I. Shapiro. Moscow, Izdatel'stvo Nauka, 1973. 192 p. 298 refs. In Russian.

An introduction to current mathematical methods of modeling

the regulatory functions of the nervous system. Part one gives the basic mathematical tools (identification, theory of optimum control, game theory, game theory of automata, theory of statistical solutions, neuron networks, perceptrons, and topology) while part two describes the basic elements of the regulatory system. In part three, the modeling of each function using the techniques introduced in part one is discussed. The coverage starts with the neuron itself and proceeds through the areas of metabolism, cerebral blood flow, vegetative functions, sensory systems, and motor systems to topics of human behavior in social environments. The exposition uses both the authors' own work and bibliographic material from domestic and foreign sources. J.K.K.

A74-36195 * Fine structure of tannin accumulations in callus cultures of *Pinus elliotti* / slash pine/. P. S. Baur (Texas, University, Galveston, Tex.) and C. H. Walkinshaw (NASA, Johnson Space Center, Health Service Div., Houston, Tex.). *Canadian Journal of Botany*, vol. 52, no. 3, 1974, p. 615-619. 17 refs. Research supported by the U.S. Department of Agriculture and NASA.

A74-36208 Energetics of swimming in man. P. E. di Prampero, D. R. Pendergast, D. W. Wilson, and D. W. Rennie (New York, State University, Buffalo, N.Y.). *Journal of Applied Physiology*, vol. 37, July 1974, p. 1-5. 26 refs. Contract No. N00014-68-A-0216. NR Project 101-722.

Presented investigation results on the energetics of swimming in man show that the energy expenditure during swimming at a given speed is a linear function of the total drag a swimmer has to overcome. At constant speed, the slope of this function is a measure of the overall mechanical efficiency of the swimming process. The results indicate also that both drag and mechanical efficiency are on the average 30% higher than previous estimates based on the drag of passively towed subjects. Under the method used in the investigation, the body drag was determined by adding extra drag loads to a crawl swimmer moving at a known speed. This method can be extended to various strokes, higher velocities, male and female swimmers, and other forms of aquatic locomotion. M.V.E.

A74-36209 Effect of inspiratory flow rate on regional distribution of inspired gas. B. Bake, L. Wood, B. Murphy, P. T. Macklem, and J. Milic-Emili (Royal Victoria Hospital, Montreal, Canada). *Journal of Applied Physiology*, vol. 37, July 1974, p. 8-17. 40 refs. Research supported by the Medical Research Council of Canada.

Investigation of the pattern of change in the distribution of inspired gas occurring at increases in the inspiratory flow rate. The distribution of the second 100 ml of inspired gas among vertical lung regions is found to be determined by regional elastic properties when the inspiratory flow rate is less than 0.2 l/sec. Between 0.2 and 0.5 l/sec, regional resistances influence the distribution, and above 1.5 l/s when all regions are equally ventilated, regional resistances are the prime determinants of regional ventilation. This suggests that regional resistances are independent of regional lung expansion, a feature which markedly reduces the effect of flow rate and breathing frequency on ventilation distribution. M.V.E.

A74-36210 Cardiopulmonary function in prospective competitive swimmers and their parents. G. W. Ness, D. A. Cunningham, R. B. Eynon, and D. B. Shaw (Western Ontario, University, London, Ontario, Canada). *Journal of Applied Physiology*, vol. 37, July 1974, p. 27-31. 27 refs.

The cardiopulmonary performance in prospective female competitive swimmers was compared with that in other young girls not involved in competitive swimming. The parents of the two girl groups were likewise compared in an attempt to investigate predisposition in the prospective swimmers. No significant differences were observed

among the groups of girls or parents in any measures of static lung capacities and dynamic lung volume, with the exception that the swimmers' fathers possessed greater functional residual capacity and total lung capacity values. M.V.E.

A74-36211 Diffusional and metabolic components of nitrogen elimination through the lungs. K. Muysers, U. Smidt, G. von Nieding, H. Krekeler, and K. E. Schaefer (Krankenhaus Bethanien, Moers, West Germany; U.S. Naval Submarine Medical Research Laboratory, Groton, Conn.). *Journal of Applied Physiology*, vol. 37, July 1974, p. 32-37. 25 refs.

Using mass spectrometric analysis, the contributions of cutaneous diffusion of atmospheric nitrogen to pulmonary nitrogen elimination were investigated. An attempt was made to differentiate the diffusional from the metabolic components of nitrogen excretion. Information was obtained also about nitrogen elimination under increased pressure. M.V.E.

A74-36212 Plasma volume changes during acute exposure to a high environmental temperature. M. H. Harrison (RAF, Institute of Aviation Medicine, Farnborough, Hants., England). *Journal of Applied Physiology*, vol. 37, July 1974, p. 38-42. 16 refs.

Experimental investigation of the effect on plasma volume of a heat exposure designed to produce a progressive dehydration in resting subjects. The results indicate that water is lost at a constant rate from the intravascular space during heat-induced dehydration, and that the hematocrit and plasma protein concentration are quantitatively representative of plasma volume change. M.V.E.

A74-36213 Oxygen deficit and debt in submaximal exercise at sea level and high altitude. J. Raynaud, J. P. Martineaud, J. Bordachar, M. C. Tillous, and J. Durand (Paris, Université, Département de Physiologie Humaine, Le Kremlin-Bicêtre, Val-de-Marne; Centre Chirurgical Marie Lannelongue, Paris, France; Instituto Boliviano de Biología de Altura, La Paz, Bolivia). *Journal of Applied Physiology*, vol. 37, July 1974, p. 43-48. 35 refs. Research supported by the Service de la Coopération Technique and Délégation Générale à la Recherche Scientifique et Technique.

Presented investigation results on the kinetics of oxygen uptake during exercise show that, for a given work load, the oxygen deficit is larger at high altitude than at sea level. However, the relationship between deficit and percent of maximal oxygen uptake remains unchanged because the oxygen uptake is reduced by about 15 per cent at high altitude. Oxygen debt increases with intensity and

A74-36214 Hemodynamic and respiratory responses compared in swimming and running. I. Holmer, E. M. Stein, B. Saltin, B. Ekblom, and P.-O. Astrand (Gymnastik- och Idrottshogskolan; National Board of Occupational Safety and Health, Stockholm, Sweden). *Journal of Applied Physiology*, vol. 37, July 1974, p. 49-54. 19 refs. Research supported by the Swedish National Association against Heart and Chest Diseases and Swedish Sport Federation.

On average, maximum oxygen uptake and maximum cardiac output were found to be 15% and 10% lower, respectively, in swimming compared with running, whereas maximum stroke volume was found to be about the same. Mean arterial blood pressure was higher during swimming. Maximal values for blood lactate were similar for both modes of exercise. M.V.E.

A74-36215 Body composition, sinking force, and oxygen uptake of man treading water. W. von Döbeln (Gymnastik- och Idrottshogskolan, Stockholm, Sweden) and I. Holmer (National Board of Occupational Safety and Health, Stockholm, Sweden). *Journal of Applied Physiology*, vol. 37, July 1974, p. 55-59. 8 refs. Research supported by the Swedish Medical Research Council, Swedish National Association against Heart and Chest Diseases, and Swedish Sport Federation.

The sinking force in a vertical floating position and the oxygen uptake to maintain this position by treading water were determined in 11 female and 4 male subjects. The two variables were found to be highly related (0.963), and both demonstrated high relationships with body weight in water and lean body mass. M.V.E.

A74-36216 Variability of maximum expiratory flow-volume curves. M. Green, J. Mead, and J. M. Turner (Harvard University, Boston, Mass.). *Journal of Applied Physiology*, vol. 37, July 1974, p. 67-74. 34 refs. Grant No. NIH-HL-14580.

Study of maximum expiratory flow volume curves of 56 healthy adults divided into 10-year age cohorts. A large interindividual variability of flow was found when expressed in liter per second at given percentages of the vital capacity: the mean 95% CLI (i.e., 95% confidence limit for individuals as a percentage of mean) was 65%. An attempt was made to reduce this variability by size compensation, and it was found that the variability did not significantly diminish. Other factors influencing the variability of the maximum flow were investigated. Some of the variability could be accounted for by intraindividual variation (mean 95% CLI = 18%). Lung static recoil contributed little to interindividual variability, and it was concluded that most of the variability in maximum flows might be attributable to the airways. M.V.E.

A74-36217 Effects of hypoxia on peripheral visual response to rapid sustained stimulation. J. L. Kobrick (U.S. Army, Research Institute of Environmental Medicine, Natick, Mass.). *Journal of Applied Physiology*, vol. 37, July 1974, p. 75-79. 6 refs.

The response time to 48 peripherally distributed lights, which flashed in random pattern at 10-sec intervals for an entire 3.25-hour period, was measured in nine subjects exposed to hypobaric elevations of 13, 15, and 17 thousand feet. Response impairments were maximal for stimuli in the upper and lower medial periphery and increased significantly in direct relation to hypoxic severity. These results corroborated previous findings. The impairments which occurred became maximal within the first 32 min of exposure and gradually recovered thereafter. Instead of further impairing performance, the heavy task load apparently acted to maintain attention and alertness. There was no correspondence between performance impairment and the incidence and development of acute mountain sickness. M.V.E.

A74-36218 Effect of carbon monoxide on cardiac weight as compared with altitude effects. D. Penney, M. Benjamin, and E. Dunham (Illinois, University, Chicago, Ill.). *Journal of Applied Physiology*, vol. 37, July 1974, p. 80-84. 32 refs.

Carboxyhemoglobin levels of 9.26, 15.82 and 41.12% of total hemoglobin and increases of 0.94, 2.08, and 10.05 g per 100 ml in hemoglobin were found, respectively, in 60-day-old rats exposed continuously for several weeks to air containing 100, 200, or 500 ppm of carbon monoxide. Significant increases in overall heart weight were established in the rats exposed to 200 and 500 ppm of carbon monoxide. Marked hemoglobin content and heart weight increases, with the right ventricle being a major site of weight increase, were also observed in altitude-exposed rats. V.Z.

A74-36219 Respiratory heat loss at increased core temperature. R. Hanson (RAF, Institute of Aviation Medicine, Farnborough; RAF, Institute of Naval Medicine, Alverstoke, Hants., England). *Journal of Applied Physiology*, vol. 37, July 1974, p. 103-107. 34 refs.

Convective and evaporative respiratory heat losses were measured in 36 experiments on four male subjects who breathed air at

A74-36220 Effect of high ambient pressure on human apneic bradycardia. D. Kerem and J. Salzano (Duke University, Durham, N.C.). *Journal of Applied Physiology*, vol. 37, July 1974, p. 108-111. 20 refs. Grant No. PHS-HL-07896.

A study of heart rate responses of six male divers to dry breath holding and face-immersion breath holding (FIBH) in 30 C water at ambient pressures up to 27 ATA indicates that the bradycardial effects of face immersion and high ambient pressures are neither synergic nor additive. These and other published data support the conclusion that the minimum FIBH heart rate is constant and independent of prebreath-hold rate for a given temperature in a resting state. V.Z.

A74-36221 Tissue gases during hypovolemic shock. J. W. Brantigan, E. C. Ziegler, K. M. Hynes, T. Y. Miyazawa, and A. M. Smith (USAF, Aerospace Medical Research Laboratory, Wright-Patterson AFB, Ohio). *Journal of Applied Physiology*, vol. 37, July 1974, p. 117-122. 41 refs.

Muscle and subcutaneous tissue gases were measured with a Teflon membrane-mass spectrometer system during graded hemorrhage in seven dogs. Tissue oxygen declined in both muscle and subcutaneous measurements with progressive hemorrhage and reached minimum values approaching zero at a mean arterial pressure of about 40. Tissue carbon dioxide initially declined in both muscle and subcutaneous measurements, then began a progressive rise after a 30% blood loss. Arterial blood gases remained normal throughout each study and do not provide an adequate index of tissue oxygenation. Profound tissue hypoxia and metabolic acidosis can occur in the presence of normal blood gases. F.R.L.

A74-36222 A micromixing method for determination of oxygen equilibria in blood. M. H. Blunt (U.S. Veterans Administration Hospital; Georgia, Medical College, Augusta, Ga.). *Journal of Applied Physiology*, vol. 37, July 1974, p. 123-125. 14 refs. Grant No. PHS-HL-05168.

A modification of the mixing method for the determination of oxygen-hemoglobin equilibria is described using 200 microliters of blood in calibrated capillary tubes. Oxygen dissociation curves, the Bohr effect, and the oxygen tension in torr at 50% oxyhemoglobin saturation of humans, dogs, and goats were determined by this method. Equilibration was produced at several tensions of carbon dioxide. (Author)

A74-36223 A television method for measuring capillary red cell velocities. A. H. Goodman, A. C. Guyton, R. Drake, and J. H. Loflin (Mississippi, University, Jackson, Miss.; Sydney, University, Sydney, Australia). *Journal of Applied Physiology*, vol. 37, July 1974, p. 126-130. Grants No. PHS-TW-1818; No. PHS-HL-11678.

A television system is described for measuring the velocity of red cells in capillaries. The system comprises three main components: (1) a transistorized vidicon television camera coupled to a binocular microscope having additional optics for a camera. The microscope incorporates a blower-cooled stroboscopic light source. (2) A video processing unit that samples the video signal from the camera, controls the camera, prepares the video information for the computer, and generates synchronizing signals for the computer and the stroboscopic light source. (3) An on-line digital computer programmed to calculate red cell velocity from the sampled video information. The computer provides input to a chart recorder for a continuous record of red cell velocity. The advantages of the system are that processing may be performed on-line, or the video data can be tape recorded for later replay and processing, that the inherent high sensitivity of the television camera tube and its ability to store optical information allow the use of a relatively low-power light source, and that simultaneous measurements of arteriolar or venular diameter can be made. F.R.L.

A74-36224 A servo-force balance isometric muscle force transducer. S. R. Goldstein (National Institutes of Health, Bethesda, Md.). *Journal of Applied Physiology*, vol. 37, July 1974, p. 134-137. 7 refs.

An isometric force transducer employing a self-contained

servo-force balance system is described. This concept allows design compromises involving compliance, sensitivity, long-term stability, noise, and dynamic response which are substantially improved over conventional transducers. Full-scale forces of 1,000 and 10,000 dyn are readily obtained by using a precision lever system. (Author)

A74-36228 Studies of peripheral circulatory rhythms in resting and exercising humans. R. E. Smith and W. Malyj, Jr. (California, University, Davis, Calif.). In: *Chronobiology*. Tokyo, Igaku Shoin, Ltd., 1974, p. 733-736.

The studies reported involved simultaneous measurements of pressure, flow, and related cardiovascular and thermoregulatory variables. Data were obtained at rest and at a standardized exercise level in order to evaluate peripheral circulatory control under loading. An analysis of potential errors is conducted and attention is given to the methodology employed to insure reliability of the variety of data obtained in the studies. G.R.

A74-36229 * Glossary of selected chronobiologic terms. F. Halberg and J.-K. Lee (Minnesota, University, Minneapolis, Minn.). In: *Chronobiology*. Tokyo, Igaku Shoin, Ltd., 1974, p. XXXVII-L. NASA-supported research; Grants No. PHS-5-K6-GM-13891; No. PHS-1-R01-CA-14445-01-S1.

A74-36323 # Man as a precious resource - The enhancement of human effectiveness in air transport operations. S. N. Roscoe (Illinois, University, Urbana, Ill.). In: *A review of precious resources and their effect on air transport*; Proceedings of the Spring Convention, London, England, May 15, 16, 1974.

London, Royal Aeronautical Society, 1974. 19 p. 45 refs.

The state of the art of behavioral engineering and technology is discussed in the context of aviation psychology, the science of the behavior of manned systems. Selection and training of aircraft crews, display and control systems designs, pilot training and testing, training cost effectiveness, training objectives, and fidelity of training devices are covered. Attention is given to innovations in flight training such as automatically adaptive training, computer-aided instruction, and adaptive measurement of residual attention. V.Z.

A74-36324 Fibers projecting onto the Crista ampullaris of the vertical anterior semicircular canal from other ipsilateral vestibular receptors in the frog (*Rana esculenta*). A. Gribenski and J. Caston (Rouen, Université, Mont-Saint-Aignan, France). *Pflügers Archiv*, vol. 349, no. 3, 1974, p. 257-265. 11 refs.

A74-36358 The influence of dehydration on heat dissipation mechanisms in the rabbit. E. Turlejska-Stelmasiak (Polish Academy of Sciences, Laboratory of Applied Physiology, Warsaw, Poland). *Journal de Physiologie*, vol. 68, Mar. 1974, p. 5-15. 20 refs.

Measurement of the panting response to local heating of the preoptic anterior hypothalamic area (POA) in normally hydrated and dehydrated rabbits exposed to changes in ambient temperatures and during infusion of various dextran and NaCl solutions, aimed at investigating the influence of dehydration on the heat dissipation mechanisms in rabbits. The results obtained include the findings that: (1) in normally hydrated rabbits, the effects of POA heating on the panting response depend on the ambient temperature; (2) in dehydrated rabbits, the panting response is suppressed regardless of ambient temperature; (3) cellular dehydration of POA neurons is probably responsible for the inhibition of panting in the dehydrated rabbit. M.V.E.

A74-36359 Cortical and intracortical study of parietal and temporal evoked visual potentials in photosensitive baboons (Etude corticale et intra-corticale des potentiels évoqués visuels temporaux et pariétaux chez le babouin photosensible). J. Catier and G. Charmasson (CNRS, Institut de Neurophysiologie et de Psychophysiology, Marseille, France). *Journal de Physiologie*, vol. 68, Mar. 1974, p. 37-49. 27 refs. In French.

Systematic study of nonspecific evoked visual potentials (EVP) obtained from mono- and bipolar recordings performed with the aid of cortical and intracortical macro-electrodes in the parietal and temporal lobes of ten photosensitive baboons immobilized by gallamine and subjected to continuous local anesthesia. Considerable topographical and morphological variability was found in the EVP responses to the light stimuli presented at a frequency of 1 flash per sec. The responses showed four groups of potentials with different latencies. The origin of the visual responses and the possible existence of a relationship between photosensitivity and the evoked visual potentials are discussed. M.V.E.

A74-36360 Reaction of the resistive and capacitive vessels of the hand at the start of muscular exercise (La réaction des vaisseaux résistifs et capacitifs de la main au début de l'exercice musculaire). J. M. Verpillat, A. Ghaem, B. Levy, and J. P. Martineaud (Paris VIII, Université; Paris V, Université, Paris, France). *Journal de Physiologie*, vol. 68, Mar. 1974, p. 51-64. 24 refs. In French.

Review of measurement data on heart rate, blood flow through the hand arteries, and hand vein volume variation in man during leg exercise at exertions ranging from 30 to 180 W. At short (5 to 8 min) exercise durations, the arterial blood flow and venous volume are found to change similarly: an initial decrease is followed by a progressive increase. Maximum venous volume change and minimum arterial blood flow show no significant link with either the heart rate or the exertion intensity. These results suggest the possibility that the resistive and capacitive vessels of the hand may perform the function of a flow and volume reserve at the start of exercise. M.V.E.

A74-36361 Study of the ventilation function during thermal or hypocapnic polypnea (Contribution à l'étude de la fonction ventilatoire au cours de la polypnée thermique ou hypocapnique). R. Monteau, G. Hilaire, and C. Ouedraogo (Aix-Marseille I, Université, Marseille, France). *Journal de Physiologie*, vol. 68, Mar. 1974, p. 97-120. 45 refs. In French.

Breathing pattern variations in terms of respiratory frequency, electrical-activity level of the phrenic nerve, and CO₂ concentration in alveolar air were studied in anesthetized cats during polypnea. Hyperthermia is found to induce an increase in the respiratory frequency and a decrease in alveolar CO₂ concentration. If the latter decrease is not checked, polypnea often results. In artificially ventilated, anesthetized cats, local heating of the anterior hypothalamus leads to polypnea when alveolar CO₂ concentration is low. If the cat is kept normocapnic, no large increases in respiratory frequency occur. In the normothermic cat, hyperventilation induces hypocapnic polypnea. The modifications in electric phrenic nerve activity occurring during polypnea are discussed. M.V.E.

A74-36362 On functions and structure of deep layers of immature auditory cortex. N. König and R. Marty (Montpellier II, Université, Montpellier, France). *Journal de Physiologie*, vol. 68, June 1974, p. 145-155. 39 refs. Research supported by Centre National de la Recherche Scientifique.

Extension of a recent laminar analysis by König et al. (1972) of the micro- and macropotentials of the auditory cortex of the cat to mammals less mature at birth: the rabbit and the rat. In the 5-day old rabbit, three types of macropotentials were recorded at various levels of the cortex: predominantly negative potentials on the surface, negative-positive potentials in layer V, and positive-negative potentials in layer VI. A deep positive-negative response was recorded in all the rats studied. Histological examinations revealed different types of relatively well differentiated neurons as well as numerous synapses in the deep layers of the auditory cortex. M.V.E.

A74-36363 Effect of heat on growth hormone secretion and adrenal cortex activity in rats (Effet de la chaleur sur la sécrétion de l'hormone de croissance et sur l'activité du cortex surrénalien du Rat). M. T. Strosser, B. Bucher, B. Briaud, B. Lutz, B. Koch, and C. Mialhe (Strasbourg I, Université, Strasbourg, France). *Journal de Physiologie*, vol. 68, June 1974, p. 181-191. 26 refs. In French. Direction des Recherches et Moyens d'Essais Contracts No. 71/596; No. 73/028.

Study of the endocrine modifications induced by the acclimatization to heat in rats, with emphasis upon the effects of rises in ambient temperature on the corticotrophic and somatotrophic functions. The results obtained suggest that the regulating mechanism of growth hormone secretion may be more sensitive to heat than the ACTH secretion mechanism. M.V.E.

A74-36364 Phrenic motoneuron activity during thermal or hypocapnic polypnea (Activité des motoneurones phréniques au cours de la polypnée thermique ou hypocapnique). G. Hilaire and R. Monteau (Aix-Marseille I, Université, Marseille, France). *Journal de Physiologie*, vol. 68, June 1974, p. 193-203. 5 refs. In French.

The individual activity of 29 early-discharging and 29 late-discharging phrenic motoneurons were studied in cats during thermal or hypocapnic polypnea. The results suggest that early- and late-discharging phrenic motoneurons are excited predominantly by the inspiratory bulbo-spinal neurons of the corresponding types. M.V.E.

A74-36374 * Microbial detection method based on sensing molecular hydrogen. J. R. Wilkins (NASA, Langley Research Center, Hampton, Va.), G. E. Stoner (Virginia, University, Charlottesville, Va.), and E. H. Boykin (Northrop Services, Inc., Hampton, Va.). *Applied Microbiology*, vol. 27, May 1974, p. 949-952.

An approach involving the measurement of hydrogen evolution by test organisms was used to detect and enumerate various members of the Enterobacteriaceae group. The experimental setup for measuring hydrogen evolution consisted of a test tube containing two electrodes plus broth and organisms. The test tube was kept in a water bath at a temperature of 35 C. It is pointed out that the hydrogen-sensing method, coupled with the pressure transducer technique reported by Wilkins (1974) could be used in various experiments in which gas production by microorganisms is being measured. G.R.

A74-36398 Heart rate and energy-yielding substrates in blood during long-lasting running. J. Keul, G. Haralambie, T. Arnold, and W. Schumann (Freiburg, Universität, Freiburg im Breisgau, West Germany). *European Journal of Applied Physiology*, vol. 32, no. 4, 1974, p. 279-289. 53 refs. Research supported by the Deutsche Forschungsgemeinschaft and Bundesinstitut für Sportwissenschaften.

A74-36399 Comparative investigations of the learning process in tracking tests of constant or quasi-constant and self-adapting difficulty level. I - Middle learning level - Reliability - Antagonism learning/fatigue. II - Differential diagnostic parameters - Relevant or irrelevant additional signals (Vergleichende Untersuchungen des Lernverlaufs in Trackingtests mit konstantem bzw. quasi-konstantem und sich adaptiv einstellendem Schwierigkeitsgrad. I - Mittlerer Lernfortschritt - Reliabilität - Antagonismus Lernen/Ermüdung. II - Differential-diagnostische Parameter - Relevante bzw. irrelevante Zusatzsignale). H. Strasser (München, Technische Universität, Munich, West Germany). *European Journal of Applied Physiology*, vol. 32, no. 4, 1974, p. 291-313, 315-328. 40 refs. In German. Research supported by the Kommission für wirtschaftlichen und sozialen Wandel.

Investigation of various aspects of the process of learning to perform sensorimotor or psychomotor tasks, based on measurement data obtained from tracking tests of constant, quasi-constant, and

adjusted difficulty level administered to 10 male subjects aged between 45 and 60. The results indicate that adaptive tracking tasks, in which inputs are varied as a function of how well the test subject performs, greatly accelerate the learning process in spite of shorter practice time. From these results, differential diagnostic parameter values are derived. They show that tracking tests of adaptively increased difficulty make possible the most rapid and distinct differentiation of individual learners. M.V.E.

A74-36400 Spirographic investigation of the ventilatory lung function under hyperbaric conditions (Spirographische Untersuchung der ventilatorischen Lungenfunktion unter Überdruckbedingungen). P. Dragonat and D. Drenckhahn (Marine, Schiffahrt-medizinisches Institut, Kiel, West Germany). *European Journal of Applied Physiology*, vol. 32, no. 4, 1974, p. 341-348. 20 refs. in German.

Investigation of the effects of high ambient gas pressure on the forced vital capacity, forced expiratory volume for 1 sec, and maximum voluntary ventilation in 19 healthy young subjects in a hyperbaric chamber. These simple spirometric tests are shown to be useful indicators of the increased airway resistance induced by hyperbaric conditions. M.V.E.

A74-36414 Ocular hazard from picosecond pulses of Nd:YAG laser radiation. W. T. Ham, Jr., H. A. Mueller, A. I. Goldman (Virginia Commonwealth University, Richmond, Va.), B. E. Newnam, L. M. Holland (California, University, Los Alamos, N. Mex.), and T. Kuwabara (National Institutes of Health, National Eye Institute, Bethesda, Md.). *Science*, vol. 185, July 26, 1974, p. 362, 363. 10 refs. Research supported by University of California; Grant No. DADA17-72-C-2177.

An investigation was conducted with the primary objective to define threshold damage to the retina in terms of the energy of a single pulse entering the eye. Another objective was the study by electron microscopy of the nature of the effects which picosecond single pulses of 1064-nm radiation have on the mammalian retina. Seven rhesus monkeys were used in the experiments. A comparison was conducted of the thresholds for damage to the retina in the case of Q-switched pulses and picosecond pulses. G.R.

A74-36421 Haidinger's brushes and predominant orientation of collagen in corneal stroma. C. C. D. Shute (Cambridge University, Cambridge, England). *Nature*, vol. 250, July 12, 1974, p. 163, 164. 10 refs.

When a source of bluish light, such as the sky, is viewed through polaroid glass, a characteristic figure known as Haidinger's brushes is fleetingly seen at the fixation point by most observers. The appearance of the brushes with circularly polarized light has been investigated by Shurcliff (1955). An investigation with quarter wave plate compensators as a source of circularly polarized light was conducted to repeat Shurcliff's observations. However, Shurcliff's findings could not be confirmed. The results obtained in the new investigation can be explained if the collagen in corneal stroma is predominantly oriented in the upward-and-outward diagonal. G.R.

A74-36422 The apparent heaviness of colours. E. Pinkerton and N. K. Humphrey (Cambridge University, Cambridge, England). *Nature*, vol. 250, July 12, 1974, p. 164, 165. 5 refs.

In an adaptation of Monroe's procedures (1925), the effects of color and brightness were investigated separately using larger transilluminated stimuli, with brightness carefully controlled. Each of the test stimuli was individually 'weighed' against a white stimulus of constant brightness. Five colors were used including red, orange, yellow, green, and blue. All the colors were regarded as heavier than the standard, with red the heaviest, yellow the lightest and the other three clustered in between. G.R.

A74-36465 Ozone in aircraft cabins. L. Machta (NOAA, Air Resources Laboratories, Silver Spring, Md.) and W. D. Komhyr

(NOAA, Air Resources Laboratories, Boulder, Colo.). *WMO Bulletin*, vol. 22, Oct. 1973, p. 222-226. 22 refs.

Ozone concentrations in excess of 0.1 parts per million by volume (ppm) have frequently been measured in the cabins of some present-day commercial subsonic jet aircraft. This ozone, of natural origin, enters the airplane through its ventilation system. The air quality standard for ozone is often set at 0.1 ppm. Future subsonic aircraft flying at higher altitudes may contain even higher ozone concentrations than current airplanes. It is suggested that the undesirable ozone concentrations may be reduced by passing air through an inexpensive filter in the ventilation system. (Author)

A74-36466 Quantitative effect of linear acceleration on positional alcohol nystagmus. W. J. Oosterveld (Amsterdam, University, Amsterdam, Netherlands), G. Maineri, and G. Paolucci (Italian Air Force, Aerospace Medical Centre, Rome, Italy). *Aerospace Medicine*, vol. 45, July 1974, p. 695-700. 31 refs.

The effect of linear accelerations on positional nystagmus was studied in human test subjects. Blood-alcohol determinations were made several times after the intake of a dosage of whisky. Eye-movements were recorded nystagmographically. By means of a human centrifuge the persons were subjected to a g-load from 1 up to 3 g. There proved to be a quantitative relationship between the g-load in the y-axis and the speed of the slow phase of the alcohol nystagmus. Even when no alcohol could be found in the blood anymore, an increase in g-loading was able to enhance a positional alcohol nystagmus. Also, after the intake of a very low dosage of alcohol, an increase of the g-load was able to arouse an alcohol nystagmus. If the subjects were exactly put in supine position, alcohol nystagmus was not found, even if the g-load was brought up to 3 g. (Author)

A74-36467 * Regularity in the control of the free-running sleep-wakefulness rhythm. W. B. Webb and H. W. Agnew, Jr. (Florida, University, Gainesville, Fla.). *Aerospace Medicine*, vol. 45, July 1974, p. 701-704. 7 refs. Grant No. NGR-10-005-057.

In the present experiment, rigid control over the sleep and wake-up times was employed in an attempt to contain the natural rhythm to a 24-hr cycle. Eight subjects were isolated from all time and social cues for 10 days. They were placed on a rigid schedule of sleep between 11 p.m. and 7 a.m. The results indicate that, for practical purposes, the free-running sleep-wakefulness rhythm can be contained to a 24-hr cycle by rigid control of the sleep portion of the cycle. When part of the control was released by allowing the subjects to sleep beyond 7 a.m., they slept an average of 67 min longer and showed sleep latencies which averaged 73 min. From these data it is concluded that control of the sleep portion of the sleep-wakefulness cycle, particularly control of the wake-up time, is sufficient to contain the free-running sleep-wakefulness rhythm to a 24-hr cycle. (Author)

A74-36468 * Observations on saccules of rats exposed to long-term hypergravity. D. J. Lim, J. A. Stith, C. W. Stockwell, and J. Oyama (Ohio State University, Columbus, Ohio; NASA, Ames Research Center, Moffett Field, Calif.). *Aerospace Medicine*, vol. 45, July 1974, p. 705-710. 25 refs. Contract No. NAS2-6792.

The saccules of 15 centrifuged rats and 15 control rats were examined for morphological alterations resulting from long-term exposure to hypergravity. Minimal changes were found confined to the otolithic membrane. They were a slight decrease in the overall volume of otolithic membrane, a redistribution of otoconia in the direction of the gravitational force, and a more pronounced 'accessory' membrane. These changes were interpreted as purely mechanical effects of hypergravity, causing accelerated displacement of otoconia and subsequent entrapment of some of them on inferior portions of the primary otolithic membrane and 'accessory' membrane. (Author)

A74-36469 Objective approach to a design of a whole-body, water-cooled suit. E. Shvartz, M. Aldjem, J. Ben-Mordechai, and Y. Shapiro (Tel Aviv University, Tel Aviv; Negev, University, Beersheba, Israel). *Aerospace Medicine*, vol. 45, July 1974, p. 711-715. 13 refs.

A74-36470 Blood sugar levels in rats exposed to varying altitude stress for different periods of time. H. K. Das and N. C. Ghosh (University College of Science and Technology, Calcutta, India). *Aerospace Medicine*, vol. 45, July 1974, p. 716-720. 26 refs.

Blood sugar levels were measured in 24-hr fasted male rats and adrenalin treated rats exposed to simulated altitudes of 12,000 and 25,000 ft for varying periods, and in female rats at 25,000-ft exposure. It was observed that both at 12,000 and 25,000 ft the rats experienced a sharp drop in blood sugar for 30 min after an initial rise at 5 min. Increased exposure time did not cause any further appreciable change in blood sugar values. The lowering of blood sugar in the rats exposed to 25,000 ft, however, was found to be more pronounced. The hyperglycemic response following the injection of adrenalin to the fasted rats prior to the exposure to 12,000 ft was comparatively less than that of the controls, while in those rats exposed to 25,000 ft the blood sugar levels never exceeded the fasting values. The female rats showed greater reduction of blood sugar when compared with males. (Author)

A74-36471 * Oxygen effects on mortality of mice infected with *Diplococcus pneumoniae*. E. J. Angrick, N. L. Somerson, and H. S. Weiss (Ohio State University, Columbus, Ohio). *Aerospace Medicine*, vol. 45, July 1974, p. 730-734. 14 refs. Grant No. NGR-36-008-004.

Mice infected by intraperitoneal injection of *Diplococcus pneumoniae* were held at 1 atm in either hypoxic (12%), hyperoxic (75%), or a normal (21%) oxygen environment. Mortality rates indicated prolongation of survival in hypoxia and shortened survival in hyperoxia. Exposure of mice to the experimental gas mixtures prior to inoculation did not alter the results. (Author)

A74-36472 Interactions, range effects, and comparisons between tasks in experiments measuring performance with pairs of stresses - Mild heat and 1 mg of L-hyosine hydrobromide. E. C. Poulton and R. S. Edwards (Medical Research Council, Applied Psychology Unit, Cambridge, England). *Aerospace Medicine*, vol. 45, July 1974, p. 735-741.

Description of an experiment aimed at investigating the interaction between L-hyosine hydrobromide, a motion-sickness controlling drug, and a mildly hot environment, such as that of a ship's engine room, with respect to the combined effects (particularly range effects) of both upon performance of tracking, multiple-choice, and auditory-vigilance tasks. The experiment was partly designed to replicate a previous experiment on mild heat and low-frequency noise. Special attention is given to differences in conditions common to both experiments that indicate the influence of range effects.

M.V.E.

A74-36473 Normal serum calcium levels in Air Force flying personnel. R. O. Hughes (USAF, School of Aerospace Medicine, Brooks AFB, Tex.). *Aerospace Medicine*, vol. 45, July 1974, p. 742-745. 30 refs.

A USAF flying population apparently free of any condition known to be associated with abnormal serum calcium values was used to derive a normal range for this parameter. A range of 9.1 to 10.3 mg% was obtained in terms of both percentiles and plus or minus two standard deviations from the mean. The analytical method used for the serum calcium assays employed atomic absorption spectroscopy and was shown to be extremely accurate and precise by a comprehensive quality control system. (Author)

A74-36474 Effects of aircraft altitude and speed on air-to-ground visual target acquisition. R. L. Hilgendorf, S. MacLeod, and R. G. Searle (USAF, Aerospace Medical Research Laboratory, Wright-Patterson AFB, Ohio). *Aerospace Medicine*, vol. 45, July 1974, p. 746-749. 9 refs. USAF-sponsored research.

A study of the joint effects of speed and altitude on air-to-ground visual target acquisition performance was made using a 1:1000 scale circular terrain model. Subjects were required to recognize boats, trucks, and a small village while making a simulated banking turn at two altitudes (300 and 750 m) and at three speeds (240, 360, and 480 km/hr). Performance was measured in terms of errors (missed targets). Trends revealed by the data were consistent with the view that at the higher altitude, with an open view of the target, aircraft speed is a limiting factor which degrades performance through reduction in search time. At the lower altitude, however, masking effects intrude as a limiting factor. (Author)

A74-36475 * Influence of bedrest and hypercapnia upon urinary mineral excretion in man. C. L. Giannetta and H. S. Castleberry (USAF, School of Aerospace Medicine, Brooks AFB, Tex.). *Aerospace Medicine*, vol. 45, July 1974, p. 750-754. 16 refs. NASA Order T-74393.

Bedrest and hypercapnia affected urinary mineral excretion. An increase in the excretion of magnesium, calcium, and inorganic phosphorus was noted during bedrest. Zinc excretion decreased during hypercapnia; however, this decrease was not significant when the experimental and preexperimental periods were compared. The combined effect of bedrest and hypercapnia was not synergistic for calcium excretion. (Author)

A74-36476 # G suit filling pressures determined by seat back angle. J. W. Frazier, R. U. Whitney, A. B. Ashare, D. B. Rogers, and V. D. Skowronski (USAF, Aerospace Medical Research Laboratory, Wright-Patterson AFB, Ohio). *Aerospace Medicine*, vol. 45, July 1974, p. 755-757. 8 refs.

A series of human closed-loop tracking experiments was run on a dynamic environment simulator. Performance was measured at levels of 4, 5, 6, 7, and 8 g with seat back angles of 30, 45, 55, and 65 deg. The g-suit pressure schedule was modified for each seat configuration by mounting the g valve on the seat-back pan. The pressure schedules and subjects' responses are presented. It is concluded that g-suit pressures can be significantly reduced as the seat configuration becomes more supine. (Author)

A74-36477 Proposed spatial orientation flight training concept. P. J. Dowd (USAF, School of Aerospace Medicine, Brooks AFB, Ohio). *Aerospace Medicine*, vol. 45, July 1974, p. 758-765. 33 refs.

Following a review of the causes and costs of spatial disorientation, the present status of spatial orientation indoctrination, and recent studies on a spatial orientation trainer (SOT), a SOT-based spatial orientation indoctrination training concept is proposed. Using the SOT is shown to enable the student pilot to practice proper aircraft control in spite of disorienting sensory cues and to overcome sensory conflicts that result in disorientation. M.V.E.

A74-36478 Hearing threshold sensitivity in airline pilots. G. J. Kidera and P. B. Gaskill (United Air Lines, Inc., Chicago, Ill.). (International Meeting on Aerospace Medicine, 2nd, Melbourne, Australia, Oct. 30-Nov. 2, 1972.) *Aerospace Medicine*, vol. 45, July 1974, p. 780, 781.

The hearing threshold sensitivity in the commercial pilot population is shown to compare favorably with the presbycusis of the nonpilot population. In spite of the exposure to what is considered hazardous noise, the so-called 'aviator's notch' was not present in the pilots examined. M.V.E.

A74-36506 # Effect of the psychophysiological properties of a pilot on the choice of the dynamic characteristics of an aircraft (Vliianie psikhofiziologicheskikh svoistv letchika na vybor dinamicheskikh kharakteristik samoleta). G. V. Aleksandrov, M. M. Medvedev, A. N. Predtechenskii, and Iu. I. Sidorov. *TsAGI, Uchenye Zapiski*, vol. 3, no. 2, 1972, p. 86-93. 6 refs. In Russian.

Consideration of a method of choosing aircraft characteristics which is based on studies of the psychophysiological and dynamic possibilities of the human operator and on the construction of a model of the operator. It is shown that the conditions governing the pilot adaptation limits can be used to determine the range of aircraft and control system stability and controllability characteristics acceptable for piloting. Using the problem of pitch angle stabilization as an example, an attempt is made to establish those elements of pilot activity which limit the pilot's ability to adapt to changes in the aircraft characteristics and flight conditions. An estimate is made of the effect of the dynamic characteristics of the aircraft on the crew comfort on the basis of curves of tolerable g-forces obtained on movable test stands. A.B.K.

A74-36564 # Experimental investigation of the influence of loads of variable sign on pilot efficiency and passenger comfort (Eksperimental'nye issledovaniia vliianiia znakovremennykh peregruzok na professional'nuu deiatel'nost' letchika i komfort passazhirov). B. N. Aleksakhin, V. F. Zhernavkov, S. L. Kaigorodov, V. G. Kuznetsov, A. V. Malakhov, and Iu. I. Sidorov. *TsAGI, Uchenye Zapiski*, vol. 3, no. 3, 1972, p. 54-60. In Russian.

A74-36602 * Helicopter flight investigation to determine the effects of a closed-circuit TV on performance of a precision sling-load handling task. D. J. DiCarlo (NASA, Langley Research Center, Hampton, Va.), H. L. Kelley (U.S. Army, Air Mobility Research and Development Laboratory, Hampton, Va.), and D. L. Spivey (U.S. Army, Fort Eustis, Va.). *American Helicopter Society, Annual National V/STOL Forum, 30th, Washington, D.C., May 7-9, 1974, Preprint 862*. 13 p. 6 refs. Members, \$1.50; nonmembers, \$2.00.

Helicopter sling-load operations have been limited during hover and low-speed flight by the degree of precision achieved by the pilot/helicopter/sling-load combination. Previous attempts to improve precision have included stabilization of the load and helicopter and the addition of a pilot station directly facing the load. In these tests, use of a closed-circuit TV as a display that would permit sling-load delivery and placement by the forward-facing pilot was evaluated using a CH-54B helicopter. In all, three test cases were documented, which included the following: (1) forward-facing pilot using the TV display, (2) forward-facing pilot using verbal commands from a load-facing observer, and (3) aft-facing pilot using direct visual cues. The results indicate that a comparable level of performance was achieved for each test case; however, an increase in pilot workload was noted when the TV system was used. (Author)

A74-36603 Effect of nap-of-the-earth requirements on aircrew performance during night attack helicopter operations. B. L. Odneal (U.S. Army, Combat Developments Experimentation Command, Fort Ord, Calif.). *American Helicopter Society, Annual National V/STOL Forum, 30th, Washington, D.C., May 7-9, 1974, Preprint 863*. 9 p. Members, \$1.50; nonmembers, \$2.00.

Review of the experiences and findings on man, machine, and operational use gained in exploratory nighttime nap-of-the-earth helicopter flight (i.e., as close to the ground as vegetation and obstacles permit and generally following terrain contours) experiments. The activities discussed include aviator selection and training, psychological and physiological effects, mission planning, map reading and terrain interpretation, aircraft handling, emergency procedures, and man-machine problems. M.V.E.

A74-36624 Pilot workload during instrument flight. A. L. Winn and R. B. Lewis, II (U.S. Army, Edwards AFB, Calif.). *American Helicopter Society, Annual National V/STOL Forum, 30th, Washington, D.C., May 7-9, 1974, Preprint 820*. 7 p. 10 refs. Members, \$1.50; nonmembers, \$2.00.

Workload analysis including pilot effort and flight path accuracy software was developed for testing on the OH-6A helicopter. Several approaches were used to obtain pilot effort information from flight control activity. The control activity parameter which indicated the most consistent correlation with pilot opinion was the line integral of control displacement. During the tests, it was determined that a definable trade-off exists between pilot effort and flight path accuracy. It has been possible to show this quantitatively by examining the product of flight path accuracy expressed in terms of standard deviation from the mean and control activity expressed in terms of the line integral of control displacement. This procedure provided good agreement with qualitative pilot ratings for certain flight conditions. F.R.L.

A74-36625 Visual and manual workload of the helicopter pilot. D. D. Strother (Bell Helicopter Co., Fort Worth, Tex.). *American Helicopter Society, Annual National V/STOL Forum, 30th, Washington, D.C., May 7-9, 1974, Preprint 821*. 7 p. Members, \$1.50; nonmembers, \$2.00.

Two facets of the total pilot workload are discussed. The first addresses manipulative workload during single-pilot actual instrument flight in a high-density zone. Data indicate that the helicopter pilot has ample time to perform his required manipulative tasks. The second discusses visual workload and an experimental technique for measuring this load. Data are presented which indicate an interaction of visual workload with altitude. (Author)

A74-36652 # Changes in the plasma electrolyte levels of the rabbits during acute exposure to simulated high altitude. M. Kagami, E. Sakaguchi, T. Akiyama, T. Yanaka, and R. Yurugi (Japan Air Self Defense Force, Aeromedical Laboratory, Tokyo, Japan). *Japan Air Self Defence Force, Aeromedical Laboratory, Reports*, vol. 14, Sept. 1973, p. 51-56. 23 refs. In Japanese, with abstract in English.

Investigation of the effect of exposure to moderate hypobaric hypoxia on plasma electrolyte levels in rabbits subjected to a simulated altitude of 18,000 feet above sea level with ambient temperatures of 19 to 21 C. During the first ten hours of altitude exposure, a rise in plasma sodium and potassium levels and a less marked increase in calcium concentration were observed. The concentration of plasma chloride increased progressively. M.V.E.

A74-36653 # Consideration of investigation on reading error of aircraft instruments. H. Hagihara, S. Aramaki, T. Ito, and Y. Nagasawa (Japan Air Self Defense Force, Aeromedical Laboratory, Tokyo, Japan). *Japan Air Self Defence Force, Aeromedical Laboratory, Reports*, vol. 14, Sept. 1973, p. 57-66. 22 refs. In Japanese, with abstract in English.

The design merits of six flight instruments - namely: speed, altitude, heading, climb, attitude, and turn and bank indicators - were investigated in terms of human engineering by means of questionnaires answered by 200 pilots. The results include the findings that altimeter, heading, and attitude reading errors were numerous. The error causes and their correction are discussed. M.V.E.

A74-36654 # Effects of acute exposure to hypobaric hypoxia on water contents in the blood and several tissues in the rat. E. Sakaguchi and T. Akiyama (Japan Air Self Defense Force, Aeromedical Laboratory, Tokyo, Japan). *Japan Air Self Defence Force, Aeromedical Laboratory, Reports*, vol. 14, Sept. 1973, p. 76-85. 59 refs. In Japanese, with abstract in English.

Investigation of the body water balance during hypobaric hypoxia in rats exposed to a reduced atmospheric pressure of 0.25 atm (abs) for two hours. The water content in the blood, brain, lungs, liver, muscles, and spleen was measured by the dry weight method. The results include the findings that in the hypoxia-exposed rats the water content increased in the liver (particularly, in the dead group of succumbed rats), decreased in the blood, plasma, and lungs, and did not significantly change in the brain, muscle, and spleen. Some of the implications of these and other findings are discussed.

M.V.E.

A74-36655 # The analysis of aviation training evaluations. I - Effects of flying hours upon training evaluations. M. Okaue, M. Nakamura, S. Shiraki, and H. Hori (Japan Air Self Defense Force, Aeromedical Laboratory, Tokyo, Japan). *Japan Air Self Defence Force, Aeromedical Laboratory, Reports*, vol. 14, Sept. 1973, p. 86-96. 6 refs. In Japanese, with abstract in English.

Investigation of flight trainee performance as a function of flight training hours distribution among the four stages of the aviation training curriculum: Basic, PH-1, PH-2, and FC (fighter crew). Of the two trainee groups A and B who had 95 and 120 hrs in Basic, 65 and 30 hrs in PH-1, 90 and 90 hrs in PH-2, and 83 and 83 hrs in FC training, respectively, group A showed a significantly superior flight performance. This and other findings lead to the conclusion that flying hours in PH-1 are more effective than those in Basic training.

M.V.E.

A74-36656 # Relationship between susceptibility to motion sickness and tolerance to Coriolis forces. I. Saito, Y. Matsuba, K. Nakahara, and H. Sugawara (Japan Air Self Defense Force, Aeromedical Laboratory, Tokyo, Japan). *Japan Air Self Defence Force, Aeromedical Laboratory, Reports*, vol. 14, Sept. 1973, p. 97-101. In Japanese, with abstract in English.

Upon 30 men on a spatial disorientator, tolerance to Coriolis forces was experimentally investigated in its relation to individual motion sickness susceptibility estimated from answered questionnaires. On the spatial disorientator rotating at a constant 15-rpm velocity, the test subjects were made to bend their heads right and left at 1-sec time intervals until their discomfort became unendurable. The correlation between the head motion number and the scores derived from the Coriolis-force generated symptoms showed a proportional relationship in logarithmic expression. Subjects estimated to be highly susceptible to motion sickness could not bend their heads more than 14 times and showed strong symptoms of motion sickness.

M.V.E.

A74-36658 # The optimization of control gain by self-adjustment (Die Optimierung der Bediensignalverstärkung durch Selbsteinstellung). W. Kruse and G. Rotbauer. Meckenheim, West Germany, Gesellschaft zur Förderung der astrophysikalischen Forschung (Forschungsbericht, No. 13), 1974. 48 p. 19 refs. In German. \$43.95.

The method considered makes it possible for the operator to adjust the control gain with the aid of a control knob in order to obtain the most favorable operating conditions. In the case of a first order tracking system an optimum range of control quality was determined by measuring errors with five control gains. Tests conducted with subjects having differing experience levels show that the optimum of the control gain does not depend on the degree of training of the operator. The investigation shows that man can obtain an optimization of the control gain by observing the result of his control activity on the display screen and by taking into account difficulties involved in the control process.

G.R.

A74-36659 # Investigation methods for manual control processes (Beiträge zu Untersuchungsmethoden für manuelle Regelvorgänge). W. Stein. Meckenheim, West Germany, Gesellschaft zur

Förderung der astrophysikalischen Forschung (Forschungsbericht, No. 15), 1973. 118 p. 41 refs. In German. \$3.95.

Questions concerning statistical signal and system analysis with correlation procedures are discussed, giving attention to mathematical concepts and definitions, a scheme of correlation procedures, and experimental considerations. The properties of stochastic signals are considered along with the autocorrelation function, performance density functions, connections between stochastic signals, the description of nonlinear transfer characteristics, and the mathematical description of the man-machine control system. Aspects of an experimental system analysis by means of the gradient method are explored, taking into account the identification of one-parameter and two-parameter linear systems. Questions concerning the identification of not strictly linear systems are also explored.

G.R.

A74-36682 Vibrational technology: Criteria for shock effects and shock tolerance; Colloquium, Technische Hochschule Darmstadt, Darmstadt, West Germany, April 9, 10, 1973, Reports (Schwingungstechnik: Kriterien für Schockwirkungen und Schockverträglichkeit; Kolloquium, Technische Hochschule Darmstadt, Darmstadt, West Germany, April 9, 10, 1973, Vorträge). Conference sponsored by the Verein Deutscher Ingenieure. *VDI-Berichte*, no. 210, 1973. 97 p. In German.

The evaluation of collision processes on the basis of photoelastic tests is discussed along with transient processes in nonlinear vibrational systems, impedance measurements for the development of a nonlinear model of supine man, and shock tests with dummies. Other subjects considered include parameters for the description of shock effects, evaluation criteria concerning human tolerance to shock, and problems regarding the conduction and the evaluation of shock tests.

Individual items are announced in this issue.

G.R.

A74-36685 Impedance measurements for the development of a nonlinear model of supine man (Impedanzmessungen zur Entwicklung eines nichtlinearen Modells des liegenden Menschen). L. H. Vogt and H. E. Krause. (Verein Deutscher Ingenieure, Kolloquium über Kriterien für Schockwirkungen und Schockverträglichkeit, Darmstadt, West Germany, Apr. 9, 10, 1973.) *VDI-Berichte*, no. 210, 1973, p. 21-28. 15 refs. In German. Bundesministerium für Bildung und Wissenschaft Contract No. WRK-108.

It is shown that investigations involving mechanical vibrations can lead to a better understanding of the processes which determine human tolerance of physical shock. Various approaches can be used to investigate the human tolerance of physical shock. One of these makes use of models of the human body. Studies of the impedance of the human body are needed to obtain quantitative data for the model. The mechanical impedance of subjects under conditions of enhanced static acceleration was investigated. The investigation involved tests with subjects in a supine position, a centrifuge, and a vibration table. Questions concerning the vibrational model of supine man are discussed, giving attention to the experimental data obtained.

G.R.

A74-36686 Shock tests with dummies and their evaluation (Schockversuche mit Testpuppen und ihre Beurteilung). H. Dupuis and G. Kleinhans. (Verein Deutscher Ingenieure, Kolloquium über Kriterien für Schockwirkungen und Schockverträglichkeit, Darmstadt, West Germany, Apr. 9, 10, 1973.) *VDI-Berichte*, no. 210, 1973, p. 29-32. 11 refs. In German.

Of physiological interest is the reaction of man in the case of shocks which occur only once and of shocks which occur repeatedly on a regular or irregular basis. Adequate fundamental data as a basis for the establishment of limits regarding the human tolerance of shock under various conditions are not yet available. A method

developed in the U.S. for aeronautics and astronautics is based on empirical data. Tests with dummies appear to be appropriate for the investigation of the effect of single shocks. An approach for evaluating a shock test with dummies is illustrated with the aid of an example. G.R.

A74-36687 Parameters for the description of shock effects and shock tolerance limits (Kenngrößen zur Beschreibung von Schockwirkungen und Schockverträglichkeitsgrenzen). K. E. Meier-Dörnberg. (Verein Deutscher Ingenieure, Kolloquium über Kriterien für Schockwirkungen und Schockverträglichkeit, Darmstadt, West Germany, Apr. 9, 10, 1973.) VDI-Berichte, no. 210, 1973, p. 37-47. In German.

The study of shock problems involves generally the investigation of questions regarding the maximum values of stress, deformation and motion of the considered system. Difficulties in the mathematical exploration of these questions are connected with the fact that the maximum values can only be determined by a numerical evaluation. The conditions which have to be satisfied by the parameters to be used for the description of the shock and its effects are discussed. It is found that the parameters satisfying the required conditions are the maximum values of the displacement, the velocity change, and the jerk. The theoretical foundations for the parameter relations are examined. Computational examples for the determination of the considered parameters are presented along with the results of a number of experimental investigations. G.R.

A74-36688 Human tolerance to shock - Evaluation criteria and limiting values (Schockverträglichkeit des Menschen - Beurteilungskriterien und Grenzwerte). K. E. Meier-Dörnberg. (Verein Deutscher Ingenieure, Kolloquium über Kriterien für Schockwirkungen und Schockverträglichkeit, Darmstadt, West Germany, Apr. 9, 10, 1973.) VDI-Berichte, no. 210, 1973, p. 49-52. In German.

Data concerning the ability of man to withstand shock effects are considered, giving attention to the maximum acceleration which can be tolerated for times exceeding 1 sec and times of acceleration in the range from 50 to 1000 msec. The magnitude of the increase in acceleration is important for times of acceleration in the range from 50 to 100 msec. Conditions during the impact on water of a spacecraft after reentry are discussed along with shock effects involving the head and the ability of man to withstand shock in various body positions. The significance of the crash factor for the evaluation of shock effects in automobile accidents is also examined. G.R.

A74-36689 The shock test, its problems at the present time and in the future (Die Schockprüfung, ihre Probleme in Gegenwart und Zukunft). H. Raddatz. (Verein Deutscher Ingenieure, Kolloquium über Kriterien für Schockwirkungen und Schockverträglichkeit, Darmstadt, West Germany, Apr. 9, 10, 1973.) VDI-Berichte, no. 210, 1973, p. 61-64. In German.

A great number of different devices for the generation of shocks make it possible to obtain shocks with almost any characteristics. Problems concerning the conduction of the shock tests are considered, giving attention to the selection of the locations for the measurement of the momentum within a shock-producing device, disturbing effects, and frequency problems concerning the shock characteristics. Other problems in shock tests are connected with the evaluation of the test data. Shock tests involving a given shock spectrum are considered along with tests conducted with devices which produce vibrations. G.R.

A74-36751 Detection of changes in spatial position. IV - Multiple display fields, display aiding, and interference. I. Pollack (Michigan, University, Ann Arbor, Mich.). *Human Factors*, vol. 16, Apr. 1974, p. 93-116. 18 refs. Navy-supported research.

The detection of changes in spatial position was examined for random-dot visual patterns for sequences of 2 to 16 successive display fields. The results show that operators integrate displacement information across successive display fields; detection is nearly invariant with a fixed total displacement over successive display fields, whether the status of a particular dot is queried or whether the observer must indicate only whether any dot in the field has been displaced. The critical variable is identified as the interval between successive display fields. Display aiding, represented by a trail of displacements, is extremely effective; strikingly large performance changes - from near chance to near perfect - are observed as a function of the length of the trail, especially at long intervals between successive displacements. The rate of trail fading proved to be a relatively insensitive variable. (Author)

A74-36752 Sequential task performance - Task module relationships, reliabilities, and times. R. G. Mills and S. A. Hatfield (USAF, Aerospace Medical Research Laboratory, Wright-Patterson AFB, Ohio). *Human Factors*, vol. 16, Apr. 1974, p. 117-128. 10 refs. USAF-sponsored research.

A methodology has been developed and an experiment conducted to examine some of the assumptions and combinatorial rules employed in applying human performance reliability (HPR) and task time data to the quantification of human performance. Subjects performed a variety of tasks designed to provide empirical estimates of HPR and task time and to permit examination of the effects of combining tasks. Results indicated (1) the normality assumption for distribution of task time is inappropriate, (2) the rules for combining task times are satisfactory if the underlying distribution of task times is known, (3) HPR is affected severely by combining tasks, and (4) any model for estimating HPR will require parameters to account for task combining and difficulty. (Author)

A74-36753 Lythgoe's visual stereophenomenon in the natural environment - A possible factor in air and highway accidents. J. T. Walker (Missouri, University, St. Louis, Mo.). *Human Factors*, vol. 16, Apr. 1974, p. 134-138. 10 refs.

The path of a horizontally moving object, when viewed binocularly, appears distorted in depth if a light shines in only one of the observer's eyes. The image in the lighted eye has a shorter visual latency period than the image in the other eye, and this temporal difference between image latencies translates into an apparent spatial difference between image positions - binocular disparity - which results in the apparent depth displacement of the moving object. In the natural visual environment, one eye can be lighted by the sun while the other is shaded by the nose, and thus, distortions may be produced in the apparent paths of airplanes, or of traffic moving on the ground. The roles that such distortions may play in some air and highway accidents have not been considered previously. (Author)

A74-36754 # Experimental evaluation of an airborne illumination system. R. L. Hilgendorf (USAF, Aerospace Medical Research Laboratory, Wright-Patterson AFB, Ohio). *Human Factors*, vol. 16, Apr. 1974, p. 181-185.

To evaluate an airborne illumination system for night reconnaissance, two investigations were conducted, one in flight and one in the laboratory, both using scaled simulation. The in-flight investigation suggested the desirability of: (1) using an observation aircraft flying below the 'light ship'; and (2) increasing the limits of permissible lateral coverage of the lights. Both hypotheses were confirmed by a scale-model laboratory experiment. (Author)

A74-36755 Display collimation under whole-body vibration... R. V. Wilson (Royal Aircraft Establishment, Human Factors Group, Farnborough, Hants., England). *Human Factors*, vol. 16, Apr. 1974, p. 186-195. 25 refs.

sidered, giving attention to the selection of the locations for the measurement of the momentum within a shock-producing device, disturbing effects, and frequency problems concerning the shock characteristics. Other problems in shock tests are connected with the evaluation of the test data. Shock tests involving a given shock spectrum are considered along with tests conducted with devices which produce vibrations. G.F.

A74-36771 Sight and mind: An introduction to visual perception. L. Kaufman (New York University, New York, N.Y.). New York, Oxford University Press, Inc., 1974. 589 p. 543 refs. \$14.95.

Questions regarding the nature of perceiving are considered, taking into account the concept of psychophysical isomorphism, relations between perceiving and the elements of consciousness, attention and perception, the immediacy of experience, the inclusiveness of consciousness, the possibility of a strictly cognitive psychology, and bioelectric indicators. The relations between light and the visual pathways are discussed along with the sensitivity to light, the perception of flicker, aspects of contrast and contour, and the perception of color. Problems of space perception are explored, giving attention to the cues of depth, binocular stereopsis, the perception of size and movement, and the rearrangement of perceptual space. Aspects of form and information processing are also investigated. G.R.

A74-36775 The dangerous sky: A history of aviation medicine. D. H. Robinson. Seattle, University of Washington Press, 1974. 326 p. 277 refs. \$15.

A detailed account is given of the development of aviation medicine from the first balloon flights in 1783 to the modern jet age. The history of how man has overcome biological handicaps impeding air travel is discussed within the framework of the development of aviation in general and of aircraft design in particular, noting how progress in aircraft capability has created the physiological and psychological stresses affecting the human pilot and his passengers. Also, emphasis is placed on the medical research and practical application of the knowledge obtained, which protects the human occupants of an aircraft against the adverse effects of the flying environment. A particularly detailed account is given of the role of aircraft in World War I and of the medical problems resulting from the use of these relatively primitive craft. The great advances of the interwar years in aviation medicine are then reviewed, culminating in the achievements of aviation medicine during World War II. Finally, the role of aviation medicine in high-altitude jet flights, including flights at supersonic speeds, is discussed, as well as problems resulting from the use of aircraft as a mass transport medium. A.B.K.

A74-36905 An evaluation of several cardiac activation models. R. Plonsey (Case-Western-Reserve University, Cleveland, Ohio). *Journal of Electrocardiology*, vol. 7, July 1974, p. 237-244. 20 refs. Grant No. NIH-HL-010417.

Three different models of cardiac activation are proposed. The first considers the cardiac muscle as if it were composed of uniform (isolated) fibers parallel to the endocardial surface and through which an oblique activation wave propagates. The second model assumes propagation via end-to-end connections at anastomosing cells, so that a 'zig-zag' path from endocardium to epicardium is followed. The third model assumes that lateral cell-to-cell propagation is permissible. Various inadequacies of the models are discussed. F.R.L.

A74-36936 # Effect of cutting off the septal afferentia on acetylcholinesterase activity in the short-axon neurons of the hippocampus (Vliianie pererezki septal'nykh afferentov na aktivnost' atsetilkholinesterazy v korotkoaksonnykh neironakh gippokampa). K. N. Kul'tas, T. I. Smolikhina, E. S. Brazhnik, and O. S. Vinogradova (Akademiia Nauk SSSR, Institut Biologicheskoi Fiziki,

Pushchino-on-Oka, USSR). *Akademiia Nauk SSSR, Doklady*, vol. 216, May 11, 1974, p. 462, 463. 11 refs. In Russian.

A74-36972 Multiple crystal echocardiographic evaluation of endocardial cushion defect. D. J. Sahn, R. W. Terry, R. O'Rourke, G. Leopold (California, University, San Diego and La Jolla, Calif.), and W. F. Friedman (University Hospital, San Diego, Calif.). *Circulation*, vol. 50, July 1974, p. 25-32. 38 refs. Grants No. PHS-HL-12373; No. PHS-HL-05846.

Description of the use of a prototype multiple-crystal echocardiographic system that makes possible the visualization of cardiac cross-sectional anatomy in real time. This technique allows a substantially more precise definition of intracardiac spatial relationships and provides clinical information helpful in evaluating patients with possible endocardial cushion defect and in determining the severity of the defect. M.V.E.

A74-36973 The variable spectrum of echocardiographic manifestations of the mitral valve prolapse syndrome. A. N. DeMaria (California, University, Davis, Calif.), J. F. King, H. G. Bogren, J. E. Lies, and D. T. Mason (California, University, Davis and Sacramento, Calif.). [*American Heart Association, Scientific Sessions, 46th, Atlantic City, N.J., Nov. 9, 1973.*] *Circulation*, vol. 50, July 1974, p. 33-41. 40 refs. Research supported by the Sacramento-Yolo-Sierra Heart Association; Grant No. NIH-HL-14780.

A74-36974 Echocardiographic assessment of left ventricular function with special reference to normalized velocities. M. A. Quinones, J. K. Alexander (Baylor University; Ben Taub General Hospital, Houston, Tex.), and W. H. Gaasch (Baylor University, Houston, Tex.). *Circulation*, vol. 50, July 1974, p. 42-51. 20 refs.

A74-36975 * An improved method for echographic detection of left atrial enlargement. O. R. Brown, D. C. Harrison, and R. L. Popp (Stanford University, Stanford, Calif.). *Circulation*, vol. 50, July 1974, p. 58-64. 12 refs. Research supported by the Bay Area Heart Association; Grants No. NIH-HL-5709; No. NGR-05-020-305.

Echographic dimensions of the aortic root and left atrium were compared in 170 patients in order to assess dilation of the left atrium with reference to the relatively nondistensible fibrous aortic root. In 50 patients without cause for left atrial or aortic enlargement, the ratio of left atrial/aortic root dimensions was 0.87 to 1.11. In 80 patients with known cause for left atrial enlargement, the left atrial/aortic root ratio was greater than or equal to 1.17. In 40 patients with isolated valve disease, dilation of both the aortic root and the left atrium resulted in a left atrial/aortic root dimension ratio less than 1.17 in some patients. Despite this consideration, the comparison of left atrial and aortic root dimension appears to be as specific as, and more sensitive than, previously proposed methods for the evaluation of left atrial enlargement. (Author)

A74-36976 A method for evaluating computer programs for electrocardiographic interpretation. I - Application to the experimental IBM program of 1971. J. J. Bailey, S. B. Itscoitz, J. W. Hirshfeld, Jr., L. E. Grauer, and M. R. Horton (National Institutes of Health, Bethesda, Md.). *Circulation*, vol. 50, July 1974, p. 73-79. 21 refs.

A74-36977 A method for evaluating computer programs for electrocardiographic interpretation. II - Application to version D of the PHS program and the Mayo Clinic program of 1968. J. J. Bailey, S. B. Itscoitz, L. E. Grauer, J. W. Hirshfeld, Jr., and M. R. Horton (National Institutes of Health, Bethesda, Md.). *Circulation*, vol. 50, July 1974, p. 80-87. 13 refs.

A74-36978 A method for evaluating computer programs for electrocardiographic interpretation. III - Reproducibility testing and the sources of program errors. J. J. Bailey, M. Horton, and S. B. Itscoitz (National Institutes of Health, Bethesda, Md.). *Circulation*, vol. 50, July 1974, p. 88-93. 6 refs.

A74-36979 Detection of hypokinesia by a quantitative analysis of left ventricular cineangiograms. R. F. Leighton, S. M. Wilt, and R. P. Lewis (Ohio State University, Columbus, Ohio). *Circulation*, vol. 50, July 1974, p. 121-127. 21 refs.

The use of a method for superimposing left ventricular silhouettes is reported that makes possible the determination of normal values for the extent of regional left ventricular contractile motion. These data can then be used for the immediate detection of regional contraction abnormalities and, particularly, of hypokinesia. M.V.E.

A74-36980 A comparison of regional blood flow and oxygen utilization during dynamic forearm exercise in normal subjects and patients with congestive heart failure. R. Zeis, J. Longhurst, R. J. Capone, and D. T. Mason (California, University, Davis, Calif.). *Circulation*, vol. 50, July 1974, p. 137-143. 44 refs. Research supported by the American Heart Association; Grant No. NIH-HL-14780.

A74-36985 Research in aviation psychology; European Congress on Aviation Psychology, 10th, Paris, France, September 11-15, 1973, Transactions (Recherche en psychologie aéronautique; Congrès Européen de Psychologie Aéronautique, 10th, Paris, France, September 11-15, 1973, Actes). Congress supported by the Direction des Recherches et Moyens d'Essais and Association de l'Europe Occidentale pour la Psychologie Aéronautique. *Revue de Médecine Aéronautique et Spatiale*, vol. 13, 1st Quarter, 1974. 108 p. In French, English, and German.

Adjustment and maladjustment among basic flying course trainees, effects of domestic difficulties on aircraft pilot performance, and the flight student's image of the aircraft pilot profession are among the topics covered in papers concerned with advances in flight personnel psychology. Other topics covered include the role of man in flight system safety, experimental study of a test for evaluating personnel adjustment to the flight environment, and women as commercial pilots.

Individual items are announced in this issue. M.V.E.

A74-36986 Psychotherapy for aircrew members (Psychothérapies des membres du personnel navigant). R. Gelly and J. C. Hadni (Armée de l'Air, Centre Médical de Psychologie Clinique, Paris, France). (Direction des Recherches et Moyens d'Essais and Association de l'Europe Occidentale pour la Psychologie Aéronautique, Congrès Européen de Psychologie Aéronautique, 10th, Paris, France, Sept. 11-15, 1973.) *Revue de Médecine Aéronautique et Spatiale*, vol. 13, 1st Quarter, 1974, p. 21-28. In French.

Review of the psychotherapeutic procedures used and results obtained in a number of case histories of military aircrew members. The reviewed cases, as a rule, are not unlike those of patients in other professions. They showed neurotic or parapsychotic syndromes whose etiology pointed at roots in psycho-affective development disturbances during childhood, rather than in profession-inherent occupational causes. Being an airman did not create any problem for the patient in establishing the proper relationship with the therapist, and the therapeutic success in terms of speed and thoroughness seemed often to be a function of the patient's attachment to his profession. M.V.E.

A74-36997 Effects of domestic stress upon flying proficiency. L. R. C. Haward (Surrey, University, Guildford, England). (Direction des Recherches et Moyens d'Essais and Association de l'Europe Occidentale pour la Psychologie Aéronautique, Congrès Européen de Psychologie Aéronautique, 10th, Paris, France, Sept. 11-15, 1973.) *Revue de Médecine Aéronautique et Spatiale*, vol. 13, 1st Quarter, 1974, p. 29-31.

Review of the case history of an air pilot showing the effects of emotional stress arising from domestic difficulties upon service performance in terms of flight proficiency. This single-case psycho-

metric study is presented in the context of previous nomothetic group studies of aircrews. The role of domestic stress in flight proficiency impairment is analyzed, and some derived implications for psychophysiological screening and predictive tests are discussed. M.V.E.

A74-36988 Adjustment and maladjustment in elementary pilot training (Adaptation et inadaptation en école élémentaire de pilotage). Mr. Galle-Tessonneau (Cognac, Ecole de Pilotage, Cognac, Charente, France). (Direction des Recherches et Moyens d'Essais and Association de l'Europe Occidentale pour la Psychologie Aéronautique, Congrès Européen de Psychologie Aéronautique, 10th, Paris, France, Sept. 11-15, 1973.) *Revue de Médecine Aéronautique et Spatiale*, vol. 13, 1st Quarter, 1974, p. 32-36. In French.

Adjustment and maladjustment processes in elementary pilot students are reviewed, and the role of aviation medicine and, particularly, clinical psychology in their control is discussed. Next to its technical prerequisites, the development of pilot skills is shown to depend, to no minor extent, upon emotional and affective factors whose optimization aviation medicine can often further in various ways. M.V.E.

A74-36999 The pilot candidate's image of his profession (Image du métier de pilote chez les candidats). J. Dupont (Aéronautique Navale, Service de Psychologie Appliquée, France). (Direction des Recherches et Moyens d'Essais and Association de l'Europe Occidentale pour la Psychologie Aéronautique, Congrès Européen de Psychologie Aéronautique, 10th, Paris, France, Sept. 11-15, 1973.) *Revue de Médecine Aéronautique et Spatiale*, vol. 13, 1st Quarter, 1974, p. 37-40. In French.

Review of the answers received from 234 pilot candidates about the attributes they felt to be the most characteristic of the airman's profession. A cultural analysis of these answers shows a gradual shift in the pilot candidate's image of the profession from emphases on power and liberation toward self-control and responsibility as a function of technological-constraint evolution. M.V.E.

A74-37000 Present notions on the psychological selection of aircrews (Notions actuelles sur la sélection psychologique du personnel navigant). H. Moreau and M. Duffaut (Armée de l'Air, Centre Médical de Psychologie Clinique, Paris, France). (Direction des Recherches et Moyens d'Essais and Association de l'Europe Occidentale pour la Psychologie Aéronautique, Congrès Européen de Psychologie Aéronautique, 10th, Paris, France, Sept. 11-15, 1973.) *Revue de Médecine Aéronautique et Spatiale*, vol. 13, 1st Quarter, 1974, p. 42-46. 11 refs. In French.

Review of past and present underlying concepts, practical goals, cultural and economic aspects, and employed techniques of aircrew selection. Special attention is given to the latest trends emphasizing a more flexible attitude toward the consequences of initial selection and allowing more carefully for the significance of psychodynamic factors. M.V.E.

A74-37001 Women commercial pilots. E. P. Wilson (Australian Institute of Industrial Psychology, Sydney, Australia). (Direction des Recherches et Moyens d'Essais and Association de l'Europe Occidentale pour la Psychologie Aéronautique, Congrès Européen de Psychologie Aéronautique, 10th, Paris, France, Sept. 11-15, 1973.) *Revue de Médecine Aéronautique et Spatiale*, vol. 13, 1st Quarter, 1974, p. 47, 48.

Consideration of the fitness of women for work as commercial airline or military pilots. While there is proof that some women can be as competent as men, and respond to advanced training with complete equality of performance, it is felt that, generally, women are temperamentally unsuited to a whole and full life in either military or commercial flying. M.V.E.

A74-37002 Study of relations among the behavioral patterns, sociometric indices, and performance in pilot training at a commercial aviation school (Untersuchungen über Zusammenhänge

zwischen Verhaltensdimensionen, soziometrischen Daten und Leistungen in Lehrgängen einer zivilen Fliegerschule). S. Ruff, K. Steininger, and S. Fichtbauer (Deutsche Forschungs- und Versuchsanstalt für Luft- und Raumfahrt, Institut für Flugmedizin, Bad Godesberg, West Germany). (*Direction des Recherches et Moyens d'Essais and Association de l'Europe Occidentale pour la Psychologie Aéronautique, Congrès Européen de Psychologie Aéronautique, 10th, Paris, France, Sept. 11-15, 1973.*) *Revue de Médecine Aéronautique et Spatiale*, vol. 13, 1st Quarter, 1974, p. 49-54. 8 refs. In German.

Review of the results of tests administered early and late in a training program to pilot trainees at a commercial aviation school, in order to study the possibly positive relations between several behavioral patterns and a trainee's recognition status within his group, and between the latter status and his flight performance during training. The results suggest an evolution in these relations as a function of the time during which the acquaintance of students with each other develops. M.V.E.

A74-37003 Experimental study of a specific projective test for the evaluation of adjustment to the aviation environment (*Etude expérimentale d'un test projectif spécifique de l'adaptation aéronautique*). P. Gaudriault (Armée de l'Air, Centre Médical de Psychologie Clinique, Paris, France). (*Direction des Recherches et Moyens d'Essais and Association de l'Europe Occidentale pour la Psychologie Aéronautique, Congrès Européen de Psychologie Aéronautique, 10th, Paris, France, Sept. 11-15, 1973.*) *Revue de Médecine Aéronautique et Spatiale*, vol. 13, 1st Quarter, 1974, p. 55-60. In French.

Review of the results of an analysis of the responses to a projective test, derived from Murray's Thematic Aperception Test and including ten aviation-related pictures about each of which the test subject is asked to tell a story. The test was administered to three groups of subjects: well adjusted pilots, inadequately adjusted pilots, and subjects having no flying experience (control group). The responses are shown to reveal a specific pattern for each group. M.V.E.

A74-37004 Pilot factor in aircraft accidents of the German Federal Armed Forces. B. Falckenberg (Bundesministerium der Verteidigung, Luftwaffe, Flugmedizinisches Institut, Fürstenfeldbruck, West Germany). (*Direction des Recherches et Moyens d'Essais and Association de l'Europe Occidentale pour la Psychologie Aéronautique, Congrès Européen de Psychologie Aéronautique, 10th, Paris, France, Sept. 11-15, 1973.*) *Revue de Médecine Aéronautique et Spatiale*, vol. 13, 1st Quarter, 1974, p. 61-67.

The results of an analysis of 154 aircraft accidents that occurred between 1967 and 1970 and were caused by the most frequent types of pilot error are reviewed. Special attention is given to differences between pilots of jet, propeller, and helicopter aircraft. The pilot's flying experience, his age, and various other time-dependent factors are allowed for. It is found that, in general, pilot errors occurred predominantly during low-level flight and during the landing phase immediately before touchdown. In jet aircraft accidents, the majority of pilot errors is due to an excessive aircraft-handling workload, whereas in accidents of other aircraft, particularly propeller-driven ones, they are due mostly to wrong flight attitude. M.V.E.

A74-37005 Achievement motivation in pilots-selection. H. van der Maas. (*Direction des Recherches et Moyens d'Essais and Association de l'Europe Occidentale pour la Psychologie Aéronautique, Congrès Européen de Psychologie Aéronautique, 10th, Paris, France, Sept. 11-15, 1973.*) *Revue de Médecine Aéronautique et Spatiale*, vol. 13, 1st Quarter, 1974, p. 68-74. 9 refs.

Study of an Achievement Motivation Test (AMT) designed for use in military pilot selection and, particularly, for improving the predictive validity of the pilot selection test battery. The results of the study show that the experimental groups (i.e., fighter pilots,

light-aircraft pilots, student pilots) are discriminated from the general population. However, the AMT contribution to an increase in predictive validity of the pilot selection test battery is small. M.V.E.

A74-37006 The role of man in system safety. S. J. Gerathwohl (FAA, Washington, D.C.). (*Direction des Recherches et Moyens d'Essais and Association de l'Europe Occidentale pour la Psychologie Aéronautique, Congrès Européen de Psychologie Aéronautique, 10th, Paris, France, Sept. 11-15, 1973.*) *Revue de Médecine Aéronautique et Spatiale*, vol. 13, 1st Quarter, 1974, p. 76-80. 19 refs.

Since the ultimate concern in aviation is system safety, the advantages of modern technology far outweigh the pilot's ego-involvement and personal motives. He will be more and more integrated into the man-machine complex. With advanced subsystems available 'inner loop' control can be made completely automatic. Only warning and command signals are necessary to alert the pilot in case of failure. The next step aims at using human control logic for automatic control of 'outer loop' function for all contingencies. Further reductions of workload through elimination of the need to change radio frequencies, through electronic voice switching, and direct reporting to air traffic control centers will be of great benefit. If the cockpit is properly designed and the pilot fully integrated into the system, the workload, strain, and other stress-producing factors can be kept at a minimum. F.R.L.

A74-37007 The consequences of degradations of the awake state on ocular positioning by saccadic movements (*Les conséquences des dégradations de l'état d'éveil sur les mouvements de positionnement oculaire par saccades*). R. Angiboust (Armée de l'Air, Laboratoire Central de Biologie Aéronautique, Paris, France). (*Direction des Recherches et Moyens d'Essais and Association de l'Europe Occidentale pour la Psychologie Aéronautique, Congrès Européen de Psychologie Aéronautique, 10th, Paris, France, Sept. 11-15, 1973.*) *Revue de Médecine Aéronautique et Spatiale*, vol. 13, 1st Quarter, 1974, p. 81-86. 6 refs. In French.

The experiment proposes to verify the qualitative results previously obtained, and to analyze the parameters of non-deteriorated saccades in an attempt to bring to the test a quantitative aspect which would eventually permit prediction of behavioral modifications. Deteriorations of the vigilance state artificially obtained by oral administration of central nervous system depressants or spontaneously by manipulation of sleep deprivation produces qualitative and quantitative alternations of eye movements effected for gaze positioning. Positioning by saccadic movements is deeply perturbed and gradually replaced by positioning by smooth movements. Maximal speed of saccadic movements decreases. These changes reveal a decrement in the functional value of the oculomotor system. They can affect flight safety either directly by an increase in motor response time, or indirectly by compelling the operator to use his voluntary attention in order to maintain the level of performance required by the task. F.R.L.

A74-37008 Human factors principles in map design. R. M. Taylor and V. D. Hopkin (RAF, Institute of Aviation Medicine, Farnborough, Hants., England). (*Direction des Recherches et Moyens d'Essais and Association de l'Europe Occidentale pour la Psychologie Aéronautique, Congrès Européen de Psychologie Aéronautique, 10th, Paris, France, Sept. 11-15, 1973.*) *Revue de Médecine Aéronautique et Spatiale*, vol. 13, 1st Quarter, 1974, p. 87-91. 13 refs.

Batteries of tasks, derived from the range of functions which the map is intended to fulfil, can be used to study individual differences, the factors which these differences are related to, and the skills which are relevant to map usage. It becomes possible to judge how far these skills may be improved by selection and training of map users. Suggestions can be made on how map design needs to be adapted to meet flight environment conditions or technical innovations in the displaying of maps, and on desirable modifications to map contents and formats to make the maps more compatible with

various kinds of collateral material. Factors affecting both the efficiency and acceptability of maps can be suggested and studied.

F.R.L.

A74-37009 The human operator in a tracking task - Foresight and strategy (L'opérateur humain dans une tâche de pistage - Prévision et stratégie). M. Citta (Louvain, Université Catholique, Louvain, Belgium). (*Direction des Recherches et Moyens d'Essais and Association de l'Europe Occidentale pour la Psychologie Aéronautique, Congrès Européen de Psychologie Aéronautique, 10th, Paris, France, Sept. 11-15, 1973.*) *Revue de Médecine Aéronautique et Spatiale*, vol. 13, 1st Quarter, 1974, p. 92-96. In French.

Consideration of some of the characteristics of the psychological and physiological mechanisms called into operation in a tracking task performed by a human operator. It is shown that for a simple monitoring task (visual tracking with manual control) the most direct procedure is to eliminate errors by correcting the 'position' as accurately and frequently as possible. The reaction time required for the processing through the central nervous system increases with the accuracy level demanded. A different procedure consists in that the human operator estimates the 'speed' of the signal he is monitoring and uses the information to predict its evolution. Thus, he compensates, at least partly, for the delays entailed by the operations of the perception, central nervous system, and effector organs. The evaluation of the speed and the integration of this information into the response involve a time expenditure that varies with the degree of accuracy required. For the same degree of accuracy, the reaction time is substantially shorter in the case of 'position' correction than in that of 'speed' correction.

M.V.E.

A74-37010 Stress and the air traffic controller. R. E. Meyer (International Federation of Air Traffic Controllers Associations, Troon, Scotland). (*Direction des Recherches et Moyens d'Essais and Association de l'Europe Occidentale pour la Psychologie Aéronautique, Congrès Européen de Psychologie Aéronautique, 10th, Paris, France, Sept. 11-15, 1973.*) *Revue de Médecine Aéronautique et Spatiale*, vol. 13, 1st Quarter, 1974, p. 97-106. 52 refs.

The flight controller's task requires continuous vigilance, possibly for extended periods without a break. A significant factor to be borne in mind is that the individual controller has no control over his rate of work. His is a supply on demand predicament. It has been recorded that with increasing traffic density, controllers are able to maintain a high performance level but that as they do, the stress level rises accordingly and the ultimate safe tolerance level becomes the limiting factor on the system. It is shown, however, that his task level is not the only serious source of stress but that other factors such as noise, the effects of shift work, family problems, and others all contribute in varying degrees to the operator's workload. It must be kept firmly in mind, however, that whatever his loading is, he must still attain the highest degree of safety that is humanly possible.

F.R.L.

A74-37011 # The development of an experimental human-operator sensory system (Opyt sozdaniia eksperimental'noi sistemy kontroliia sostoiianiiia cheloveka-operatora). K. A. Ivanov-Muromskii, E. T. Golovan', O. N. Luk'ianova, P. A. Petrenko, I. D. Ponomareva, V. A. Chernomorets, N. E. Afanasenko (Akademiia Nauk Ukrain'skoi SSR, Institut Kibernetiki, Kiev, Ukrainian SSR), and B. F. Sinel'nik. *Upravliushchie Sistemy i Mashiny*, Mar.-Apr. 1974, p. 32-39. 25 refs. In Russian.

Major trends in the development of automated systems for monitoring the high-stress states of a human operator are reviewed. A laboratory set up is described which permits computer processing of physiological information about an operator undergoing high-stress testing. The operator was required to perform algebraic manipulations on numbers appearing in random order on a movie screen at high speeds. A two-way hook-up allowed the experimenter to inform the subject of the task to be performed. Variable exposure times, false cueing, microphone and earphone noise and other devices were

used to heighten stress. The recording and processing of the data and the various computer programs used are described. Stress states are correlated with readings of electrocardiograms, EEG, eye movements, breathing, and other parameters. It is concluded that modern computer technology can be invaluable in studying the connection between the state gradients of an operator and the efficiency with which he performs his task.

J.K.K.

A74-37046 Evidence for the inhibition hypothesis in expanded angle illusion. D. M. Parker (King's College, Old Aberdeen, England). *Nature*, vol. 250, July 19, 1974, p. 265, 266. 14 refs.

The illusory expansion of acute angles has long been suspected to be an important contributory factor in a number of well known illusions, such as the Zollner, the Wundt-Hering, and the Poggendorf. The similarities in the operation of inhibition processes in simple visual systems and the interactions between lines indicate that lateral inhibition may be a more general phenomenon than is commonly realized. Results suggest that certain illusions which involve neighboring orientations may be explained without the theoretical involvement of constancy mechanisms.

F.R.L.

A74-37047 Form-specific colour after effects in scotopic illumination. C. F. Stromeyer, III (Stanford University, Stanford, Calif.). *Nature*, vol. 250, July 19, 1974, p. 266-268. 24 refs.

The retina of the human eye contains rod and cone receptors, and in very dim light the rods alone function (scotopic illumination) so that objects appear colorless. At higher light levels, cones also function (photopic illumination) and colors are seen. That the after effect stays tied to the adapting spatial frequency suggests that the receptive field of the mechanism underlying these effects does not lose its antagonistic surround at scotopic levels. Loss of the surround would cause patterns of low spatial frequency to elicit both the pink and green after effects, and no color would be seen since the two colors are complementary and would thus cancel.

F.R.L.

A74-37075 The effect of stochastic /mechanical/ vibrations on physiological and psychological functions and on subjective perception (Über den Einfluss stochastischer /mechanischer/ Schwingungen auf physiologische und psychologische Funktionen sowie auf die subjektive Wahrnehmung). H. Dupuis, J. L. Freund, E. Hartung (Max-Planck-Institut für Landarbeit und Landtechnik, Bad Kreuznach, West Germany), G. Kleinhans (Ernst-Rodenwaldt-Institut, Institut für Wehrmedizin und Hygiene, Koblenz, West Germany), K. G. Feuerlein (Staatliches Hochschulinstitut für Leibeseziehung, Mainz, West Germany), and D. Wiegand (Bundeswehr, Trier, West Germany). *Wehrmedizinische Monatsschrift*, vol. 18, July 1974, p. 193-204. In German.

The absence of a human defense system against mechanical vibrations is pointed out. The effects of mechanical vibrations on the human organism include acute and chronic effects. Physiological reactions to vibrational excitation are concerned with the muscular structure. Experiments with ten male subjects are described. The subjects were subjected to simulated truck vibrations in a vibration machine. Two types of seats were used in the tests. Physiological and psychological parameters were recorded. Distinct changes in the value of a number of parameters were observed during vibration. However, the type of seat used in the investigation had no effect on the test result.

G.R.

A74-37093 Eye-movements and visual perception. R. W. Ditchburn. Research supported by the Medical Research Council of England, University of Reading, and PHS. Oxford, Clarendon Press; New York, Oxford University Press, 1973. 436 p. 550 refs. \$30.50.

Methods of recording eye movements are considered along with an apparatus for producing a stabilized retinal image, questions concerning vision with stationary images, the visual system, the theory of stabilized images, the discrimination of luminance and hue, and the effect of imposed movements of the retinal image. Questions regarding the kinematic description of small eye movements are

investigated, giving attention to saccadic movements, the intersaccadic interval, median values, the accuracy of fixation, eye movements in total darkness, subjects with defective vision, and eye movements in binocular vision. Other subjects discussed include stabilized images with fluctuating luminance, the use of information in the visual system, pattern perception, the control of small eye movements, and small eye movements in relation to voluntary movements. G.R.

A74-37325 # The generalization function in monkeys - Physiological aspect (O funktsii obobshcheniia u obez'ian - Fiziologicheskii aspekt). L. A. Firsov, A. N. Znamenskaia, and E. F. Mordvinov (Akademiiia Nauk SSSR, Institut Fiziologii, Leningrad, USSR). *Akademiiia Nauk SSSR, Doklady*, vol. 216, June 1, 1974, p. 949-951. In Russian.

Experimental study of the degree of development of the generalizing function in higher and lower primates. In a two-stage study carried out on chimpanzees, baboons, macaques, and marmosets it is found that monkeys placed in a new experimental situation are capable of using a criterion distinguished by them in the course of primary learning. This may be regarded as an ability of monkeys to generalize with respect to a specific criterion. However, it is concluded that only chimpanzees and baboons are capable of extending experience acquired by them in a situation involving selection according to a size criterion to a situation requiring selection with respect to quantity. A.B.K.

A74-37373 * Effects of background event rate and critical signal amplitude on vigilance performance. K. R. Metzger, J. S. Warm, and R. J. Senter (Cincinnati, University, Cincinnati, Ohio). *Perceptual and Motor Skills*, vol. 38, June 1974, pt. 2, p. 1175-1181. 15 refs. Grant No. NGL-36-004-014.

Subjects monitored a display consisting of the repetitive presentation of pairs of movements of a bar of light. A neutral background event, for which no overt response was required, was a double deflection of 24 mm. The critical signal for detection was a longer deflection in the second movement within an event. Detection probability was greater for incremental excursions of 33% relative to 8.3% of the base movement. This effect was enhanced twofold when the event rate in which the signals were embedded was 21 as compared to 6 events/min. The results are considered in terms of the elicited observing rate hypothesis proposed by Jerison (1970).

(Author)

A74-37374 Personality correlates of visual perceptual responses. J. F. Collins, P. A. Newman (Missouri, University, Kansas City, Mo.), and S. P. Hutson (Texas Christian University, Fort Worth, Tex.). *Perceptual and Motor Skills*, vol. 38, June 1974, pt. 2, p. 1183-1187. 15 refs.

A total of 28 subjects' responses to visual perceptual tasks were measured as a function of certain personality characteristics. Half the subjects saw a list of 20 neutral words and half saw a list with four taboo words interspersed. Accuracy was independent of personality characteristics. However, the confidence ratings of subjects differed significantly as a function of each of the three personality variables tested. It was concluded that personality should be considered in assessing subjects' responses in certain types of perceptual experimentation. (Author)

A74-37437 Thermodynamics and the origin of life. P. Morrison (MIT, Cambridge, Mass.). In: *Molecules in the galactic environment*. New York, Wiley-Interscience, 1973, p. 443-450.

Relations between time and thermodynamics are considered and questions concerning the importance of free energy are examined. The irreversible flow of free energy generally tends to generate cyclic procedures. In living systems a certain fraction, amounting possibly

to 1% or 10%, of the free-energy current can be found by looking at the internal structural information content of the system. Once a system has achieved that degree of structure, it appears to be recognizable as living. Systems capable of molecular build-up include the large interstellar cloud, the condensing circumstellar regime, and a merely planetary atmospheric-gas water system. G.R.

A74-37532 # Prediction of acceleration tolerance by means of a decompression functioning test (Prognozirovanie ustoiichivosti k peregruzkam s pomoshch'iu dekompressionnoi funktsional'noi proby). V. G. Voloshin, P. M. Suvorov, A. R. Kotovskaia, and R. A. Vartbaronov. *Voенно-Meditsinskii Zhurnal*, May 1974, p. 56-59. In Russian.

Functioning tests based on decompression of the lower half of the body (DLHB) can be used to predict the positive acceleration tolerance (+G) of fighter-aircraft pilots. The diagnostic value of DLHB testing is found to depend on the amount of repetition, the choice of test subjects, and the actual conditions of decompression. Double DLHB testing of young civilians in good health at pressures of 70 mm Hg in a sitting position gave a 90.6% correlation between DLHB endurance and acceleration tolerance. However, single tests of civilians at 70 mm Hg and of flight personnel with known health defects at 70 and 50 mm Hg rarefaction failed to show any significant degree of correlation, and it is concluded that a number of refinements will be required to make the DLHB method practical. J.K.K.

A74-37739 Influence of hypoxia on tidal volume response to CO₂ in decerebrate cats. R. Rosenstein, L. E. McCarthy, and H. L. Borison (Dartmouth Medical School, Hanover, N.H.; U.S. Veterans Administration Center, White River Junction, Vt.). *Respiration Physiology*, vol. 20, June 1974, p. 239-250. 22 refs. Grant No. PHS-NS-04456.

Review of the results of an experimental study designed to characterize in decerebrate cats under steady-state conditions the effects of graded hypoxia on the tidal volume response to carbon dioxide. The roles of the vagus and carotid nerves in the mediation of these effects are examined. M.V.E.

A74-37740 Some observations on the homogeneity of response of single chemoreceptor fibres. N. W. Goodman. *Respiration Physiology*, vol. 20, June 1974, p. 271-281. 11 refs.

Simultaneous recordings on separate electrodes were made from pairs of single chemoreceptor fibers of the cat sinus nerve in order to investigate the homogeneity of the chemoreceptor population. For the 11 pairs of fibers for which it is possible to judge, four always showed the same pair ratio over the range of ventilatory stimuli likely to be encountered in life. Taken at any one moment in time, the chemoreceptors proved to be a surprisingly homogeneous population. M.V.E.

A74-37741 A theoretical analysis of the relationship between venous blood and mean tissue oxygen pressures. S. M. Tenney (Dartmouth Medical School, Hanover, N.H.). *Respiration Physiology*, vol. 20, June 1974, p. 283-296. 14 refs. Grant No. PHS-HL-0288B-17.

An equation for the mean tissue-oxygen pressure is derived from the Krogh-Erlang (1919) equation under the appropriate assumptions stated. The derived equation is solved for a number of plausible conditions, in order to compare the measured values of partial oxygen pressure in venous blood with calculated mean tissue-oxygen pressure values. For normal resting conditions, a remarkably close agreement is found between the two value categories. M.V.E.

A74-37742 Evidence of altered regulation of ventilation during exposure to hypoxia. H. V. Forster, J. A. Dempsey, E. Vidruk, and G. do Pico (Wisconsin, University, Madison, Wis.). *Respiration Physiology*, vol. 20, June 1974, p. 379-392. 42 refs. Research supported by the Wisconsin Heart Association and NTRDA.

In an investigation of the hypothesis that ventilatory acclimatization of lowlanders to sojourn at 3100 m altitude is not due solely to a relative increase in medullary H(+) stimulation, the ventilatory response to the pharmacologic stimulant, doxapram hydrochloride, was measured on the same eight healthy sea-level residents during conditions of: (1) normal rest, (2) acute respiratory acidosis, (3) after 5 days of metabolic acidosis, (4) light exercise, (5) acute hypoxia, and (6) after 2-3 weeks of sojourn at 3100 m altitude. A seventh study was completed on seven lifelong residents of the 3100-m altitude. The ventilatory response to doxapram did not differ significantly between conditions 1, 2, 3, 4, and 7. The response to doxapram was, however, increased by those conditions which also increase responsiveness to physiologic stimuli, specifically, acute hypoxic and altitude sojourn. The implications of these results for the hypothesis investigated are discussed. M.V.E.

A74-37813 # The effects of sustained acceleration, airframe buffet, and aircraft flying qualities on tracking performance. A. G. Piranian (U.S. Naval Material Command, Naval Air Development Center, Warminster, Pa.). *American Institute of Aeronautics and Astronautics, Mechanics and Control of Flight Conference, Anaheim, Calif., Aug. 5-9, 1974, Paper 74-793*. 11 p. 10 refs. Members, \$1.50; nonmembers, \$2.00.

To determine the relative importance of some of the factors affecting the air-to-air tracking performance of a pilot airframe system, U.S. Navy test pilots performed tracking tasks in a centrifuge-mounted F-4 cockpit plus visual display. Sustained accelerations up to 5.0 g, buffet intensities of up to plus or minus 0.5 g, and lateral-directional flying qualities were varied independently, tracking performance being measured in terms of miss distance, percentage time within a fixed radius of the target, and pilot opinion ratings. Results show a dominant influence of flying qualities, significant influence of sustained acceleration, and negligible influence of airframe buffet. (Author)

A74-37907 Human binocular summation at absolute threshold. F. Thorn (Pacific University, Forest Grove, Ore.) and R. M. Boynton (Rochester, University, Rochester, N.Y.). *Vision Research*, vol. 14, July 1974, p. 445-458. 66 refs. Grant No. NIH-NB-00624.

Psychophysical data are presented which indicate that the neural inputs of two stimuli presented simultaneously to corresponding retinal areas summate physiologically to lower the binocular absolute threshold. This binocular summation is not present when the stimuli are separated by more than 100 msec or are delivered to non-corresponding retinal areas. A model allowing one to calculate the minimum amount of physiological summation or inhibition that occurs under different conditions is presented. (Author)

A74-37908 Uncertainty sets associated with saccadic eye movements - Basis of satisfaction control. R. F. Erlandson (Bell Telephone Laboratories, Inc., Naperville, Ill.) and D. G. Fleming (Case-Western-Reserve University, Cleveland, Ohio). *Vision Research*, vol. 14, July 1974, p. 481-486. 15 refs.

Two types of uncertainty sets associated with visual target acquisition are described; one associated with the target's presentation time and another associated with the distance of the target's image from the fovea. The characteristics of the uncertainty sets are discussed in terms of anatomical and electrophysiological data. Also discussed are the relationships between the uncertainty sets and multiple saccades. Furthermore, it is argued that these sets form the basis for the 'satisfaction' control action (versus optimization) of the saccadic system. (Author)

A74-37909 Perception of size at the detection threshold - Its accuracy and possible mechanisms. J. P. Thomas and K. K. Shimamura (California, University, Los Angeles, Calif.). *Vision*

Research, vol. 14, July 1974, p. 535-543. 11 refs. Grant No. NIH-EY-00360.

Observers judged the sizes of foveal stimuli, 10-50 min dia, presented at luminances bracketing the detection threshold. Each stimulus was perceived as having a definite size which covaried with physical size. If the diameters of two stimuli differed by more than a factor of 2, subjects discriminated the two stimuli from each other better than they discriminated either from random fluctuations in the background. Three possible models of such size perception were evaluated using uniformly illuminated disks, clusters of small dots, and annuli as stimuli. The results support the multiple, size-tuned channel model. (Author)

A74-37910 Studies on visual pattern recognition in man and animals. V. D. Gtezer, L. I. Leushina, A. A. Nevskaya, and N. V. Prazdnikova (Akademiia Nauk SSSR, Institut Fiziologii, Leningrad, USSR). *Vision Research*, vol. 14, July 1974, p. 555-583. 77 refs.

The present work is a review of studies on pattern recognition in the visual system which have appeared in the past 25 years. The basic principles and fundamental approaches to this field are outlined, discussing the main types of visual patterns recognition, the temporal characteristics of visual recognition, and the phenomenon of invariance of visual recognition. Recognition which is controlled by innate mechanisms of the visual system is distinguished from that which results from learning; recognition performance which is characterized by the independence of the amount of information received on the time of its processing is distinguished from that in which a relation does exist between these quantities. Extirpation of various regions of the animal cortex has shown that mechanism connected with the various types of recognition are localized in different regions of the cerebral cortex. The gradual development of the capacity for invariant recognition has been shown to be an evolutionary phenomenon. P.T.H.

A74-37911 * Renal parameter estimates in unrestrained dogs. R. D. Rader and C. M. Stevens (Southern California, University, Los Angeles, Calif.). *Medical and Biological Engineering*, vol. 12, July 1974, p. 465-478. 20 refs. Grant No. AF-AFOSR-72-2190; Contract No. NSR-05-018-087.

A mathematical formulation has been developed to describe the hemodynamic parameters of a conceptualized kidney model. The model was developed by considering regional pressure drops and regional storage capacities within the renal vasculature. Estimation of renal artery compliance, pre- and postglomerular resistance, and glomerular filtration pressure is feasible by considering mean levels and time derivatives of abdominal aortic pressure and renal artery flow. Changes in the smooth muscle tone of the renal vessels induced by exogenous angiotensin amide, acetylcholine, and by the anaesthetic agent halothane were estimated by use of the model. By employing totally implanted telemetry, the technique was applied on unrestrained dogs to measure renal resistive and compliant parameters while the dogs were being subjected to obedience training, to avoidance reaction, and to unrestrained caging. (Author)

A74-37924 A model for the response of seated humans to sinusoidal displacements of the seat. R. Muksian (Bryant College, Smithfield, R.I.) and C. D. Nash, Jr. (Rhode Island, University, Kingston, R.I.). *Journal of Biomechanics*, vol. 7, May 1974, p. 209-215. 21 refs.

A lumped-parameter model of the human body in the sitting position is formulated which includes the head, vertebral column, upper torso, abdomen-thorax viscera, pelvis and legs. The differential equations of motion for the rigid-body representation of the isolated masses were written for nonlinear springs and dashpots which represented the elasticity and damping, respectively, of the physical system. Also included in the equations of motion were coulomb friction forces for modeling sliding surfaces and related muscle contractions in the body, and the ballistocardiographic and diaphragm muscle forces. With all motions restricted to the vertical direction and sinusoidal displacements of the seat as the inputs, excellent agreement with mechanical and subjective experimental

responses was achieved. Additionally, in agreement with the frequency dependency of muscle forces, the possibility of frequency dependent damping coefficients was implied. (Author)

A74-38027 Doctor in space. J. P. Kerwin. *Spaceflight*, vol. 16, Aug. 1974, p. 296, 297.

A composite medical story of three Skylab crew members compiled by Kerwin, medical doctor and science pilot of the first 28-day Skylab mission, is presented. The story deals primarily on the medical symptoms of weightlessness and the abnormal sensations created by this condition. Medical findings concerning the gastrointestinal, vestibular, and cardiovascular systems, and above all the ability to perform complex scientific experiments and to function normally in space are seen to be a clear indication for the feasibility of manned space stations in near future. V.P.

STAR ENTRIES

residual nitrogen is reduced by the addition of glucose and 11 amino acids while at the same time an increase in the hemoglobin is observed. An optimum effect is achieved with large phosphate concentrations. The residual nitrogen formation is inhibited by 2,4 dinitrophenol. The source of the residual nitrogen is the reticulocytes stroma. Author

N74-27549*# Techtran Corp., Glen Burnie, Md.
TOLERANCE TO ROTATION WITH CONTINUOUS AND INTERMITTENT HEAD MOVEMENTS

F. A. Solodovnik Washington NASA Jun. 1974 6 p ref Transl into ENGLISH from Voenno-Med. Zh. (USSR), no. 4, Apr. 1974 p 53-55 (Contract NASw-2485) (NASA-TT-F-15753) Avail: NTIS HC \$4.00 CSCL 06S

Vestibular tolerance to two-side head movements while rotating in a Barany chair was measured in 12 male subjects not subjected to vestibular conditioning for 6 months prior to the experiment. Continuous and intermittent head movements (at intervals of 5 sec) were tested. Continuous head movement was better tolerated, but an illusion of rocking back and forth in the sagittal plane occurred which was absent during intermittent head movement. Continuous stimulation of specific cerebral cortex areas possibly inhibits development of vestibular-vegetative reactions and thus increases tolerance. Author

N74-27550*# California Univ., Irvine. Toxic Hazards Research Unit.

A STUDY OF THE BIOLOGICAL EFFECT OF CONTINUOUS INHALATION EXPOSURE OF 1, 1, 1-TRICHLOROETHENE (METHYL CHLOROFORM) ON ANIMALS Final Report

J. D. MacEwen, E. R. Kinkad, and C. C. Haun [1974] 57 p (NASA Order T-9035)

(NASA-CR-134323) Avail: NTIS HC \$6.00 CSCL 06I

The effects of continuous exposure to 1,1,1-trichloroethane on hepatic morphology and function are evaluated and compared with those produced by methylene chloride (dichloromethane) to determine environmental concentrations of each compound that would produce a similar biological response, i.e., a comparable increase in liver triglycerides over control levels. Experimental findings on mice, rats, dogs, and monkeys indicate that the pathological alternations observed with 1,1,1-trichloroethane are similar to those observed with dichloromethane except for different time courses of the effects and different degrees of recovery. A ten fold greater atmospheric concentration of 1,1,1-trichloroethane is required to produce the minimal liver changes found at 100 ppm dichloromethane. Author

N74-27551# Translation Consultants, Ltd., Arlington, Va.
STUDIES ON ROOM OZONIZERS AND ON OZONE OCCURRENCE IN THE OUTSIDE AIR AND IN INDUSTRIAL PLANTS

H. U. Wanner and A. Gilgen 1974 25 p refs Transl. into ENGLISH from Arch. Hyg. Bakteriell. (Munich), v. 15, no. 1, 2, 1966 p 78-91 Sponsored by EPA

(APTIC-07834; TR-162-74) Avail: NTIS HC \$4.25

Ozone in concentrations above 0.05 ppm. causes headaches, nausea and respiratory troubles. On the basis of numerous toxicological investigations the MAC value (maximum allowable concentration) for ozone has been fixed temporarily at 0.05 ppm. The ozone concentrations measured in the atmosphere vary between 0.02 and 0.05 ppm. In industry generators, electrofilters and projection cameras have been shown to cause ozone concentrations from 0.01 to 0.1 ppm. Ozonizers bring about concentrations between 0.02 and 0.03 ppm. Although it is often recommended, the use of ozonizers in rooms is to be rejected as no evidence of favorable effects could be found for concentrations within the limits of human tolerance; in addition, an increase in the ozone concentration is not perceivable and therefore health may be negatively affected. Author

N74-27552# Scientific Translation Service, Santa Barbara, Calif.
DISEASES DUE TO POLLUTIONS

O. Wada 1974 19 p refs Transl into ENGLISH from Tokyo Med. School (Tokyo), v. 25, no. 4, 1972 p 413-420 Sponsored by EPA

N74-27545# Royal Aircraft Establishment, Farnborough (England).

TO WHAT EXTENT IS THE GLYCOLYSIS IN MAMMALIAN ERYTHROCYTES CARRIED OUT VIA 2,3 DIPHOSPHOGLYCERIC ACID? ABOUT A VARIANT OF THE GLYCOLYTIC CYCLE ON THE LEVEL OF PHOSPHOGLYCERIC ACIDS

S. Rapoport and C. Nieradt Sep. 1973 12 p refs Transl. into ENGLISH from Biochem. Z. (Heidelberg), v. 326, 1955 p 231-236

(RAE-Lib-Trans-1724; BR37512) Avail: NTIS HC \$4.00

From the analysis of the ratios of 3-PGS to 2,3-PGS in rabbit erythrocytes it was found, in agreement with the results of experiments with C-14, that the predominant proportion of the glucose carbon in glycolysis is transferred via 2,3-PGS. A model of the variant of the glycolytic cycle which plays a predominant part in the erythrocyte at the level of the phosphoglyceric acids is established and its biological significance is discussed. Author

N74-27546# Royal Aircraft Establishment, Farnborough (England).

DETERMINATION OF THE ZONE OF THERMAL NEUTRALITY IN WATER

C. Boutelier, J. Colin, and J. Timbal Aug. 1973 14 p refs Transl. into ENGLISH from Rev. Med. Aeronaut. Spatiale (France), v. 10, no. 37, 1971 p 25-29

(RAE-Lib-Trans-1704) Avail: NTIS HC \$4.00

The zone of thermal neutrality in turbulent water for a naked resting man is specified. It extends between 33.3 and 32.9 C and differs distinctly from that found by other authors, which they located between 35 and 36 C. This zone may appear narrow, but it must be remembered that the heat exchange coefficient in water is higher than that for air in motion. Author

N74-27547*# Techtran Corp., Glen Burnie, Md.
EFFECT OF CORIOLIS ACCELERATION ACCUMULATION ON CATECHOLAMINE EXCRETION

N. S. Nemchenko Washington NASA Jun. 1974 6 p Transl. into ENGLISH from Voenno-Med. Zh. (USSR), no. 4, Apr. 1974, p 55-56

(Contract NASw-2485)

(NASA-TT-F-15736) Avail: NTIS HC \$4.00 CSCL 06P

The physiological level of catecholamine excretion in healthy persons was investigated and to determine the functional state of the sympathetic adrenal system on the basis of sensitivity to motion sickness created by application of accumulated coriolis accelerations. A clear-cut relationship was found to exist between catecholamine excretion and the application of such accelerations. Tolerance to application of the effect was improved by administration of an adrenalin solution prior to repeated exposure to the accelerations in the group of subjects moderately affected by vestibular-vegetative reactions. Author

N74-27548*# Techtran Corp., Glen Burnie, Md.
NITROGEN METABOLISM IN ERYTHROCYTE MATURATION; RESIDUAL NITROGEN FORMATION AND HEMOGLOBIN SYNTHESIS

H. G. Schweiger, S. Rapoport, and F. Schoelzel Washington NASA Jun. 1974 14 p refs Transl. into ENGLISH from Z. Physiol. Chem. (West Germany), v. 306, 1956 p 33-41

(Contract NASw-2485)

(NASA-TT-F-15741) Avail: NTIS HC \$4.00 CSCL 06P

The residual nitrogen of rabbit reticulocytes was reported which increases during incubation in nutrient free medium and which does not occur with mature erythrocytes. The increase in

(APTIC-41124; TR-131-74) Avail: NTIS HC \$4.00

An explanation is given of role played by clinical physicians in understanding the problems and diseases caused by air pollution. The treatment of such problems is also discussed. Postindustrial age diseases and problems are analyzed. E.H.W.

N74-27553# Translation Consultants, Ltd., Arlington, Va.

THE CHRONIC EFFECTS OF NITROGEN DIOXIDE
Taichi Nakajima and Shigeo Kusumoto 1974 4 p Transl. into ENGLISH from Taiki Osen Kenkyu (Tokyo), v. 6, no. 1, 1971 p 144 Sponsored by EPA
(APTIC-40168; TR-76-74) Avail: NTIS HC \$4.00

In order to investigate the chronic effects of nitrogen dioxide, a histopathological examination was made of mice who had been exposed to low concentrations of NO₂ gas for 24 hours/day, 7 days/week for more than one month. In addition, measurements were made of the quantity of reduced glutathione in the lung tissues. Histopathological effects were observed in the respiratory organs. Author

N74-27554# Environmental Protection Agency, Research Triangle Park, N.C. Technical Information Center.
CONCERNING THE EFFECTS OF AIR POLLUTION ON THE

HUMAN ORGANISM IN THE YOKKAICHI REGION

Oshima Hidehiko and Imai Masayuki 1974 4 p Transl. into ENGLISH from Nippon Koshu Eisei Zasshi (Japan), v. 19, no. 10, Oct. 1972 p 382

(APTIC-47896; TR-142-74) Avail: NTIS HC \$4.00

A series of epidemiological survey studies was performed beginning from fiscal year 1961 for the purpose of determining the effects of air pollution in Yokkaichi upon the human organism. The connection between obstructive respiratory diseases and air pollution was analyzed a strong correlation between chronic bronchitis and pulmonary emphysema and the sulfurous acid gas was obtained, pulmonary emphysema increased as a result of the prolongation of the pollution. Author

N74-27555*# Techtran Corp., Glen Burnie, Md.

PROTEOLYTIC ENZYMES AND PROTEIN METABOLISM IN RABBIT ERYTHROCYTES DURING CELL MATURATION IN VIVO

R. J. Haschen, W. Farr, and F. Groh Washington NASA Jun. 1974 14 p refs Transl. into ENGLISH from Acta Biol. Med. Ger. (Berlin), v. 14, 1965 p 205-215
(Contract NASw-2485)

(NASA-TM-X-15731) Avail: NTIS HC \$4.00 CSCL 06D

The haemolysate of erythrocytes of rabbits treated and not treated with phenylhydrazine analysed acid proteinase, cathepsin A, 6 exopeptidases, aspartate-amino-transferase, and total N, stroma-N, Hb-N, NPN and amino-N. The enzymes behave differently during the process of maturation: (1) Cathepsin A rapidly disappears; (2) the acid proteinase, glycyl-glycine-, glycyl-leucine- and imino-dipeptidase, as well as the aspartat-aminotransferase show a marked decrease, while leucine-aminopeptidase is slightly decreased; and (3) the activities of aminotripeptidase and imino-dipeptidase remain unchanged. The time sequence of these changes was specified more precisely by serial determinations during cellular regeneration and maturation. Author

N74-27556*# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio. Pathology Branch.

HEPATIC PATHOLOGY IN MICE AFTER CONTINUOUS HALOETHANE EXPOSURE TO 1, 1, 1-TRICHLOROETHANE Final Report

Neil S. McNutt, Robert L. Master, Ernest E. McConnell, and Fred Morris [1974] 46 p refs
(NASA Order T-9035-B)

(NASA-CR-134322) Avail: NTIS HC \$5.50 CSCL 06P

Mice exposed to either 250ppm or 1,000ppm 1,1,1-trichloroethane in air continuously for 14 weeks demonstrated significant changes in the centrilobular hepatocytes for the 1,000ppm group. Moderate liver triglyceride accumulation was evident in the 1,000ppm group and peaked at 40mg/gm of

tissue after 7 weeks of exposure. Focal hepatocyte necrosis occurred in 40% of the mice exposed to 1,000ppm for 12 weeks. This necrosis was associated with an acute inflammatory infiltrate and hypertrophy of Kupffer cells. These findings indicate that the pathological alternations observed with 1,1,1-trichloroethane are similar to those observed with dichloromethane except for different time courses of the effects and different degrees of recovery. The toxic effects of 1,1,1-trichloroethane are of a similar type to those produced by carbon tetrachloride but appear much less severe. Author.

N74-27557*# National Aeronautics and Space Administration, Ames Research Center, Moffett Field, Calif.

PERIPHERAL VISUAL RESPONSE TIME TO COLORED STIMULI IMAGED ON THE HORIZONTAL MERIDIAN

Richard F. Haines, Madeleine M. Gross (San Jose State Univ., Calif.), David Nysten (San Jose State Univ., Calif.), and L. Markham Dawson (San Jose State Univ., Calif.) Washington Jun. 1974 18 p refs

(NASA-TM-X-3086; A-5435) Avail: NTIS HC \$3.00 CSCL 06P

Two male observers were administered a binocular visual response time task to small (45 min arc), flashed, photopic stimuli at four dominant wavelengths (632 nm red; 583 nm yellow; 526 nm green; 464 nm blue) imaged across the horizontal retinal meridian. The stimuli were imaged at 10 deg arc intervals from 80 deg left to 90 deg right of fixation. Testing followed either prior light adaptation or prior dark adaptation. Results indicated that mean response time (RT) varies with stimulus color. RT is faster to yellow than to blue and green and slowest to red. In general, mean RT was found to increase from fovea to periphery for all four colors, with the curve for red stimuli exhibiting the most rapid positive acceleration with increasing angular eccentricity from the fovea. The shape of the RT distribution across the retina was also found to depend upon the state of light or dark adaptation. The findings are related to previous RT research and are discussed in terms of optimizing the color and position of colored displays on instrument panels. Author

N74-27558# State Univ. of New York, Buffalo. Dept. of Physiology.

HYPOXIA AND TISSUE GAS EXCHANGE Final Report

Leon E. Farhi 14 Sep. 1973 12 p refs

(Contract F44620-73-C-0035; AF Proj. 9777)

(AD-777158; AFOSR-73-2329TR) Avail: NTIS CSCL 06/19

The primary purpose of the present study was to elucidate the effects of perfusion, solubility and diffusivity on inert gas tissue washout patterns. The motivation for this work was a preliminary study in this laboratory in which inert gas washouts using two gases having similar blood tissue partition coefficients but different diffusivities were performed. Because no significant differences in the washout curves of the two gases were noted it was concluded that inert gas washout is perfusion rather than diffusion limited. It was hoped that the analysis described would suggest the magnitude of the diffusivity differences that are required to produce differences in the washout curves. Obtained data indicate that gas pairs with diffusivity ratios of one to three could be used to assess the importance of diffusion limitation when tissue hypoxia exists. (Modified author abstract) GRA

N74-27559# School of Aerospace Medicine, Brooks AFB, Tex.
PHYSIOLOGIC RESPONSES TO HIGH SUSTAINED PLUSGZ ACCELERATION Final Technical Report, 6 Jun. - 6 Jul. 1972

Sidney D. Leverett, Jr., Russell R. Burton, Roger J. Crossley, Edward D. Michaelson, and Samuel J. Shubrooks, Jr. Dec. 1973 74 p refs

(AF Proj. 7930)

(AD-777604; SAM-TR-73-21) Avail: NTIS CSCL 06/19

The study investigated several physiological effects of accelerations, up to 8 G for one min., and compared the RAF mini-suit with a standard full-length suit. Positive pressure breathing and forced expiration through a partially closed glottis were studied as methods of increasing tolerance to high sustained +Gz accelerations. GRA

N74-27560# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.

DETECTION OF THE K-COMPLEX IN HUMAN EEG SLEEP RECORDS M.S. Thesis

Paul R. Marlin Mar. 1974 94 p refs
(AD-777243; GE/BE/74-12) Avail: NTIS CSCL 06/16

The paper presents the development of a computer algorithm for the detection of K-complexes in the normal human sleep electroencephalogram (EEG). The detection scheme applies time and frequency domain pattern recognition techniques to a single channel (central area recording site) of digitized EEG data to identify waveforms as K-complexes. The detection of K-complexes resulted in an accuracy of 62.5% (7.3% miss error and 30.2% false detections). The primary source of false detections was the identification of Delta wave activity as K-complexes. The detection scheme is also used for scoring sleep EEG data as K-complex (Stage 2) or non-K-complex (Stages 1 and REM) sleep stages. Results of the sleep scoring effort provide an accuracy of 94% when compared to the usually scored EEG.

Author (GRA)

N74-27561# Indiana Univ., Bloomington. Dept. of Anatomy and Physiology.

PHYSIOLOGICAL ADJUSTMENTS TO ENVIRONMENTAL FACTORS

Howard H. Rostorfer 31 Aug. 1973 49 p refs
(Grant AF-AFOSR-2383-72; AF Proj. 9777)
(AD-777290; AFOSR-73-2335TR) Avail: NTIS CSCL 06/19

The report summarizes investigations in the following areas--temperature regulation in primates, mathematical modeling of pulmonary compliance and resistance, regulation of blood glucose in man during exercise, and microvascular blood flow dynamics in skeletal muscle. Data gathered during the period indicate that physiological control of evaporative heat loss due to sweating in the resting rhesus monkey is similar to that found in resting man. Experimental evidence to date indicates the rhesus can serve as an adequate thermoregulatory model for experiments which cannot be performed on man. A least squares, parameter identification has been used to assess nonlinear aspects of the mechanical properties of isolated lung and to study the effects of chronic elevated carbon dioxide for two months was insufficient to induce pulmonary damage suggesting that either higher concentration or longer exposure times are needed to induce significant changes. (Modified author abstract) GRA

N74-27562# Naval Air Development Center, Warminster, Pa. Crew Systems Dept.

FLASHBLINDNESS FOLLOWING DOUBLE FLASH EXPOSURES

Gloria T. Chisum and Phyllis E. Morway 5 Apr. 1974 14 p refs
(AD-777698; NADC-74015-40) Avail: NTIS CSCL 06/5

Times required to detect a simple display were measured following exposure to adapting flashes separated by varying intervals ranging from 2 to 90 seconds. The results indicate that for flash durations of 165 microseconds, the approximate exposure duration wherein protection equipment is used, there are no consistent variations in response times as a function of interflash interval. Author (GRA)

N74-27563# Bureau of Radiological Health, Rockville, Md. **A REVIEW OF SELECTED BIOEFFECTS THRESHOLDS FOR VARIOUS SPECTRAL RANGES OF LIGHT**

W. F. VanPelt, W. R. Payne, and R. W. Peterson Jun. 1973 70 p refs
(PB-228391/9; DHEW/FDA-74-8010) Avail: NTIS MF \$1.45, SOD HC \$1.25 as SN.1715-00063 CSCL 06R

The development and administration of programs to evaluate and control those emissions from electronic products which represent potential hazards to health was discussed. An important part of this program is the identification and understanding of the biological effects of a particular type of emission. One class of such emissions is electromagnetic energy in the infrared, visible, and ultraviolet wavelength regions emitted by lasers and other high intensity light sources. This survey and interpretation of

the scientific literature on the biological effects of light was undertaken to serve as a working reference in the establishment of safety guidelines for light sources. Author (GRA)

N74-27564# School of Aerospace Medicine, Brooks AFB, Tex. **DEVELOPMENT OF AN ELECTRONIC NEBULIZED-HUMIDIFIER Final Report, Jul. 1968 - Jul. 1973**

Jeanne L. Curtis Apr. 1974 9 p
(AF Proj. 4054)
(AD 778082; SAM-TR-74-8) Avail: NTIS CSCL 06/12

The electronic nebulizer-humidifier was designed to provide medical equipment capable of administering therapeutic humidification to patients in aeromedical aircraft. Specifications required the item to be compact, portable, lightweight, durable, and operationally compatible with both dedicated aircraft such as the C-9 and multimission aircraft such as the C-130 and C-141. In the airborne environment the unit must be capable of producing fine mist droplets (0.5 to 8 microns in diameter) to humidify and deliver moisture to the upper and lower pulmonary airways. The volume of water, as aerosol, delivered must be adjustable within a range of 5 to 3.5 ml-per minute. The nebulizer-humidifier must be easily secured to the poles of the standard (NATO) litter and be capable of providing aerosol therapy via an open face mask, face tent, tracheostomy mask, or high humidity tent. (Modified author abstract) GRA

N74-27565# Illinois Univ., Urbana. Dept. of Computer Science.

A TWO COMPARTMENTAL MODEL OF THE RESPIRATORY SYSTEM M.S. Thesis

Paul Robert Haskitt Dec. 1973 50 p refs
(PB-228669/8; UIUCDCS-R-73-616) Avail: NTIS HC \$5.50 CSCL 06P

A simplified two compartmental model of the human respiratory system is presented. The model is used to study the steady state responses to hypoxia at altitude and sea level, carbon dioxide inhalation, and metabolic disturbances, and the transient response to metabolic disturbances. GRA

N74-27566* National Aeronautics and Space Administration, Goddard Space Flight Center, Greenbelt, Md.

ARTERIAL PULSE WAVE PRESSURE TRANSDUCER Patent

Chung Kim (George Washington Univ., Washington, D. C.), Donald Gorelick (George Washington Univ., Washington, D. C.), and Wayne Chen, inventors (to NASA) (George Washington Univ., Washington, D. C.) Issued 21 May 1974 5 p Filed 25 Sep. 1972 Supersedes N73-11097 (11 - 02, p 0135) Sponsored by NASA

(NASA-Case-GSC-11531-1; US-Patent-3,811,429; US-Patent-Appl-SN-291845; US-Patent-Class-128-2.05E; US-Patent-Class-73-398AR) Avail: US Patent Office CSCL 06B

An arterial pulse wave pressure transducer is introduced. The transducer is comprised of a fluid filled cavity having a flexible membrane disposed over the cavity and adapted to be placed on the skin over an artery. An arterial pulse wave creates pressure pulses in the fluid which are transduced, by a pressure sensitive transistor in direct contact with the fluid, into an electric signal. The electrical signal is representative of the pulse waves and can be recorded so as to monitor changes in the elasticity of the arterial walls. Official Gazette of the U.S. Patent Office

N74-27567 Rensselaer Polytechnic Inst., Troy, N.Y. **STEP SIZE IN THE MUNSELL COLOR ORDER SYSTEM Ph.D. Thesis**

Robert Toby Marcus 1974 277 p
Avail: Univ. Microfilms Order No. 74-12787

The effects were studied of fractioning down color differences of the size of those between adjacent samples in the Munsell color order system to those with sizes in the range of commercial tolerances. Spectrophotometric measurements on a set of samples in the near gray region of color space extended from a neutral series along five constant hue lines: 10YR, 2.5Y, 5Y, 7.5Y and 10Y. A high degree of linearity between the visual scale and the measured renotation coordinates for both chroma and value.

N74-27568

leading to the preliminary conclusion that in the near gray region of color space, the Munsell color order system does indeed retain its characteristics of perceptual uniformity when fractionated to the range of quarter step increments in value and chroma.

Dissert. Abstr.

N74-27568*# Rancho Los Amigos Hospital, Inc., Downey, Calif. **DESIGN AND FABRICATE A PAIR OF RANCHO ANTHROPOMORPHIC MANIPULATOR ARMS** Final Report, 17 Feb. 1972 - 31 Dec. 1972

James R. Allen, Andrew Karchak, Jr., and Ernest L. Bontrager
31 Dec. 1972 30 p
(Contract NASB-28361)

(NASA-CR-120275) Avail: NTIS HC \$4.50 CSCL 05H

The basic design features of the Rancho Anthropomorphic Manipulator (RAM), bilateral manipulator system are reported. In contrast with other previous electrically powered manipulators, the RAM features increased payload capability, structural integrity, position control, and the ability to interchange its own terminal devices. A set of detailed design drawings and a motion picture are considered.

Author

N74-27569# Royal Aircraft Establishment, Farnborough (England).

CONTRIBUTION TO THE OPTIMISATION OF THE OSCILLATORY PROPERTIES OF A VEHICLE: PHYSIOLOGICAL FOUNDATIONS OF COMFORT DURING OSCILLATIONS
Dusan Simic Feb. 1974 124 p refs Transl. into ENGLISH from the German report D-38

(RAE Lib-Trans-1707; BR39871; D-38) Avail: NTIS HC \$9 25

Throughout the laboratory vibration tests, a car seat was used with an electrohydraulic vibrator with a frequency range between 0.1 and 50 Hz. Initially, reaction of some 10 male subjects to vertical (nominally sinusoidal) vibration was explored, covering thresholds of perception and curves of equal perception strength. The latter were obtained by subjective estimation of acceptable exposure times from 10 minutes to 8 hours, and in the idealized form finally presented, show an increase in g from 0.2 Hz to 1 Hz, then level to 2.5Hz, falling to a trough between 5 and 20 Hz. In the second series of tests, reaction to pitching oscillation was investigated using the vibrator linked to a variable lever system so that the amount of pure rotation and translation could be varied. Thresholds of perception, and equal perception strength for various estimated times, were again obtained, and are similar in shape to those for purely vertical excitation up to about 3 Hz, but then rise to a plateau from about 10 to 30 Hz. The final tests were made to explore the theory that tolerance of humans to externally applied vertical vibrations is closely linked with the self induced accelerations and frequencies which occur during motion on foot.

Author

N74-27570*# SCI Systems, Inc., Houston, Tex. **BIOMEDICAL ENGINEERING TASKS** Final Report, 1 Mar. - 30 Nov. 1972

Dec. 1972 108 p
(Contract NAS9-12597)

(NASA-CR-128733) Avail: NTIS HC \$8.50 CSCL 06B

Electrocardiographic and vectorcardiographic bioinstrumentation work centered on the development of a new electrode system harness for Project Skylab. Evaluation of several silver electrode configurations proved superior impedance voltage performance for silver/silver chloride electrodes mounted flush by using a paste adhesive. A portable ECG processor has been designed and a breadboard unit has been built to sample ECG input data at a rate of 500 samples per second for arrhythmia detection. A small real time display driver program has been developed for statistical analysis on selected QPS features. Engineering work on a sleep monitoring cap assembly continued.

G.G.

N74-27571*# Stanford Research Inst., Menlo Park, Calif. **STUDY TO DESIGN AND DEVELOP REMOTE MANIPULATOR SYSTEM** Final Report, 1 May 1973 - 30 Apr. 1974
J. W. Hill, D. E. McGovern, and A. J. Sword May 1974 208 p refs

(Contract NAS2-7507; SRI Proj. 2583)

(NASA-CR-137528) Avail: NTIS HC \$13.50 CSCL 05H

Modeling of human performance in remote manipulation tasks is reported by automated procedures using computers to analyze and count motions during a manipulation task. Performance is monitored by an on-line computer capable of measuring the joint angles of both master and slave and in some cases the trajectory and velocity of the hand itself. In this way the operator's strategies with different transmission delays, displays, tasks, and manipulators can be analyzed in detail for comparison. Some progress is described in obtaining a set of standard tasks and difficulty measures for evaluating manipulator performance.

Author

N74-27572*# Fairchild Republic Div., Farmingdale, N.Y. **DEVELOPMENT TESTING OF A SHUTTLE URINE COLLECTION SYSTEM**

Dec. 1973 29 p

(Contract NAS9-13694)

(NASA-CR-134337; RD008T1001) Avail: NTIS HC \$4.50 CSCL 06I

Flight tests conducted in December 1973 demonstrated the ability of an unisexual urine collection subsystem to function in a zero-g environment. The urinal, which could be adjusted with three degrees of freedom, accommodated 16 female test subjects with a wide range of stature, as well as five male test subjects. The urinal was in intimate contact with the female and was contoured to form an effective air seal at the periphery. When positioned 2-4 inches forward, the urinal could be used for male collection and contact was not required.

Author

N74-27573*# California Univ., San Diego. Dept. of Neurosciences.

VERTEX EVOKED POTENTIALS IN A RATING-SCALE DETECTION TASK: RELATION TO SIGNAL PROBABILITY
Kenneth C. Squires, Nancy K. Squires, and Steven A. Hillyard [1974] 33 p refs

(Grants NGR-05-009-083)

(NASA-CR-138796) Avail: NTIS HC \$4.75 CSCL 05E

Vertex evoked potentials were recorded from human subjects performing in an auditory detection task with rating scale responses. Three values of a priori probability of signal presentation were tested. The amplitudes of the N1 and P3 components of the vertex potential associated with correct detections of the signal were found to be systematically related to the strictness of the response criterion and independent of variations in a priori signal probability. No similar evoked potential components were found associated with signal absent judgements (misses and correct rejections) regardless of the confidence level of the judgement or signal probability. These results strongly support the contention that the form of the vertex evoked response is closely correlated with the subject's psychophysical decision regarding the presence or absence of a threshold level signal.

Author

N74-27574*# Kanner (Leo) Associates, Redwood City, Calif. **CARDIAC RHYTHM COMPUTER ANALYSIS TECHNIQUES**
V. V. Syrotskyy, O. P. Vetrov, and V. V. Garbovskyy Washington

NASA Jun. 1974 9 p refs Transl. into ENGLISH from *Fiziol. Zh. (USSR)*, v. 20, no. 2, Mar. - Apr. 1974 P 254-257

(Contract NASw-2481)

(NASA-TT-F-15733) Avail: NTIS HC \$4.00 CSCL 06B

Variational pulsometry, in conjunction with computerized data input, permits the utilization of quantitative criteria and statistical parameters to refine diagnostic science. The most sensitive parameters of cardiac rhythm were found to be strain, the coefficient of variation, and the percentage of dominance of sympathetic effects.

Author

N74-27575*# General American Transportation Corp., Niles, Ill. General American Research Div.

DEVELOPMENT OF INTEGRATED, ZERO-g PNEUMATIC TRANSPORTER/ROTATING PADDLE INCINERATOR/CATALYTIC AFTERBURNER SUBSYSTEM FOR PROCESSING HUMAN WASTES ON BOARD SPACECRAFT Component Performance Summary Report

S. F. Fields, L. J. Labak, and R. J. Honegger Apr. 1974 86 p
(Contract NAS2-6386)
(NASA-CR-114763) Avail: NTIS HC \$7.50 CSCL 061

A four component system was developed which consists of a particle size reduction mechanism, a pneumatic waste transport system, a rotating-paddle incinerator, and a catalytic afterburner to be integrated into a six-man, zero-g subsystem for processing human wastes on board spacecraft. The study included the development of different concepts or functions, the establishment of operational specifications, and a critical evaluation for each of the four components. A series of laboratory tests was run, and a baseline subsystem design was established. An operational specification was also written in preparation for detailed design and testing of this baseline subsystem. Author

N74-27576# Toronto Univ. (Ontario). Inst. of Aerospace Studies

EFFECTS OF SONIC BOOM ON AUTOMOBILE-DRIVER BEHAVIOUR

Orest Volodymyr Nowakiwsky Jun. 1974 59 p refs Sponsored by Transportation Dev. Agency, Min. of Transport, and Natl. Res. Council of Can.
(UTIAS-TN-188) Avail: NTIS HC \$6.00

Test results are presented on the response and behavior of automobile drivers subjected to sonic boom disturbances under actual driving conditions. The design and development of a portable sonic boom simulator, auxiliary equipment, and experimental techniques are used to study the nature and severity of the disturbance effects. The sonic boom simulator consisting basically of loudspeakers and a function generator was mounted inside a test vehicle. It was able to produce sonic booms that were very similar to what drivers would experience following SST overflights. The simulated booms had overpressures of 3 psf, rise times of about one millisecond, and durations of 100 milliseconds. Two aspects of driving were investigated the tracking manoeuvre and the stopping task. Results from both tests indicated that driver behavior was not affected by the simulated booms, even though some drivers considered it annoying or disturbing. It may therefore be concluded from present limited statistical tests that current commercial supersonic aircraft under normal flight conditions (without superbooms) would not produce adverse effects on a driver's stopping distance or his ability to follow a particular course. Author

N74-27577# Vermont Univ., Burlington. Dept. of Psychology

ISOLATION AND SENSORY COMMUNICATION Final Report, 1 Sep. 1968 - 31 Aug. 1973

Donald G. Forgays 31 Aug. 1973 80 p refs
(Contract F44620-69-C 0001; AF Proj. 9563)
(AD-777156; AFOSR-73-2320TR) Avail: NTIS CSCL 05/10

A 1968-1973 study was made of a factor common to sensory and perceptual deprivation, isolation, and confinement: a stress to the subject. Subjects indicate this influence by low tolerance for the condition, self-report, and by physiology change. Stress is also common to many military systems. The investigation was concerned with the evaluation of special training methods and additional experiences in the reduction of stress or in the more efficient adjustment to stress. The final report is composed of the summary of findings in six subject fields of experimentation. (Modified author abstract) GRA

N74-27578# School of Aerospace Medicine, Brooks AFB, Tex.
DEVELOPMENT OF A LITTER ACCESS DEVICE FOR C-141 AEROMEDICAL AIRCRAFT Final Report, Dec. 1969 - Jul. 1973

Jeanne L. Curtis Mar. 1974 8 p
(AF Proj. 4054)
(AD-777147; SAM-TR-74-7) Avail: NTIS CSCL 06/12

The litter access device (LAD) for C-141 aeromedical aircraft was designed and developed to provide a unit which would enable aeromedical personnel to have safe access to patients in upper litter spaces and which would permit able litter patients to ascend to and descend from upper litter positions in safety during aeromedical airlift. Prototypes underwent operational test

and evaluation on Military Airlift Command aeromedical missions flown in C-141 aircraft. Evaluations indicated the litter access device fulfilled the functional and operational requirements.

Author (GRA)

N74-27579# Army Medical Research Lab., Fort Knox, Ky.
PSYCHOLOGICAL FACTORS RELATED TO THE VOLUNTARY USE OF HEARING PROTECTION IN HAZARDOUS NOISE ENVIRONMENTS Final Report

George A. Luz, Richard A. Decatur, and Robert L. Thompson
31 Oct. 1973 14 p refs
(DA Proj. 3A1-61102-B-71R)
(AD-777520; USAMRL-1066) Avail: NTIS CSCL 05/10

The objective of this study was to determine whether social contexts had any influence on the use of ear protection in a hazardous noise environment and on attitudes toward earplugs. An Army community was scanned for situations in which persons could choose to use ear protection. Behavior was measured in three different ways: pencil and paper tests, observation, and experimental manipulation. In three different situations, the usage of earplugs was significantly related to social context. A recommendation for a more precise definition of the positive incentives for ear protection was made. Author (GRA)

N74-27580# Army Aeromedical Research Lab., Fort Rucker, Ala.

SOFT (HYDROPHILIC) CONTACT LENSES IN US ARMY AVIATION: AN INVESTIGATIVE STUDY OF THE BAUSCH AND LOMB SOFLENS

John K. Crosley, Erwin G. Braun, and Robert W. Bailey Mar. 1974 26 p refs
(AD-776353; USAARL-74-10) Avail: NTIS CSCL 06/12

The use of standard acrylic or hard contact lenses has been relatively unsuccessful in the military aviation environment, particularly when worn by personnel flying rotary wing aircraft. The purpose of this study was to evaluate the applicability of one type of hydrophilic lens to U.S. Army aviation. Nineteen volunteer helicopter pilots served as subjects and three specific areas were investigated. These were: clinical procedures, foreign body involvement, and the effect of extended (72 hours) continuous wear. The results indicate that the Soflens offers certain advantages over acrylic lenses for this specialized application. There were, however, distinct problems encountered which may be lessened with the introduction of new lens materials and asepticizing techniques. Author (GRA)

N74-27581# Army Aeromedical Research Lab., Fort Rucker, Ala.

PRELIMINARY EVALUATION OF PORTABLE AVIATION OXYGEN SYSTEMS

Jay C. Bisgard, Roderick J. McNeil, and Frank S. Pettyjohn Jul. 1973 52 p refs
(DA Proj. 3A0-62110-A-819)
(AD-776348; USAARL-73-16) Avail: NTIS CSCL 06/11

The object was to determine the requirements for portable aviation oxygen systems during Army high altitude rescue and medical evacuation missions, and then to determine the necessity for R and D efforts by evaluating the potential of currently available system components to fulfill the identified requirements. This preliminary report is a record of USAARL's involvement in the area of Army aviation oxygen systems to include researching the background to achieve a proper direction for study, selection of promising systems for altitude chamber evaluation, study results, conclusions, and feasible recommendations. It was found that immediate Army requirements can be satisfied by currently available military and commercial oxygen system components. (Modified author abstract) GRA

N74-27582# Qei, Inc., Bedford, Mass.

JOINT ARMY NAVY AIR CREW IMPACT INJURY PREVENTION PROGRAM Annual Report, 1 Nov. 1972 - 31 Oct. 1973

Alan H. Rutan, Rodney W. Thorpe, Robert M. Martin, and Dorothy A. Francis 1 Nov. 1973 37 p refs
(Contract N00014-70-C-0082; NR Proj. 105-579)

(AD-777713; IM-1-Nov-73-1) Avail: NTIS CSCL 06/19

The report covers the mathematical analysis and computer-related efforts. The vertical acceleration data processing effort included the writing and testing of conversion and scaling programs, after which the vertical acceleration data was scaled and plotted. The two-dimensional data base, which includes both sensor and photographic variables, was completed; plots were made of all variables from all appropriate runs. The 3-D analysis continued with work being done on various configurations of six accelerometers. Further analysis was performed on 3-D photogrammetry including methods of calibration and data reduction of optical and X-ray photography. A preliminary regression analysis was performed with respect to head and neck response to impact acceleration. Various other programming efforts relating to the project were performed. (Modified author abstract) GRA

N74-27583# School of Aerospace Medicine, Brooks AFB, Tex. **PROBLEMS IN THE SELECTION OF PERSONNEL OPERATORS FOR CLOSED ECOLOGIC SYSTEMS AND PROPHYLACTIC MEASURES FOR NEUROPSYCHIC DISORDERS**

O. N. Kuznetsov and V. I. Lebedev 1974 40 p Transl. into ENGLISH from the book "Psikhologiya i Psikhopatologiya Odinochestva Meditsina" Moscow, 1972 (AD-777684; SAM-TT-R-1198-0474) Avail: NTIS CSCL 06/14

Cosmonauts, flyers, pilots, submarine operators, radar workers, and a host of other types of occupational workers must perform their work in ecologically closed systems. The very nature of the work, with the exception of the possibilities for direct interpersonal contacts and the effects of numerous external environmental stimuli, intensifies man's isolation in such occupations. In emergency situations where the communication network is disturbed or the automation fails, man finds himself in a critical situation of isolation. Because of this situation, actual problems in the selection of personnel involved in working in ecologically closed systems and the prophylactic measures for the prevention of neuropsychic disorders are of current interest. The report is devoted to this subject. GRA

N74-27584# National Highway Traffic Safety Administration, Washington, D.C.

AIR BAG RESTRAINT SYSTEMS Special Bibliography Report, 1967 - Oct. 1973
Oct. 1973 47 p refs
(PB-227749/9; DOT-HS-801-033; Rept-5) Avail: NTIS HC \$3.25 CSCL 13L

The documents cited in this publication are in the NHTSA Technical Reference Division collection and can be examined there. Since this collection was established in 1967 most of the publications cited bear a publication date of 1967 or later. Citations and abstracts are those that have previously appeared in the NHTSA publication Highway Safety Literature. GRA

N74-27585# Civil Aeromedical Inst., Oklahoma City, Okla. **STUDY OF CONTROL FORCE LIMITS FOR FEMALE PILOTS**

Robert C. Leeper, A. Howard Hasbrook, and Jerry L. Purswell Dec. 1973 34 p refs
(AD-777839; FAA-AM-73-23) Avail: NTIS CSCL 05/5

The study described in this paper was the second phase in a ground-based control force testing program conducted by the University of Oklahoma and the Civil Aeromedical Institute of the Federal Aviation Administration located in Oklahoma City, Oklahoma. A Convair-340 simulator, modified to conform to a typical civil aviation aircraft, was used for the study. Female pilots were used as subjects. The data show that the current FAR 23.143 control force limits for general aviation aircraft are too high for a majority of U.S. female pilots. Data on strength capabilities of women for operating aircraft controls are presented in the form of prediction equations for level of control force versus time. Author (GRA)

N74-28390* Kanner (Leo) Associates, Redwood City, Calif. **LEVEL, PECULIARITIES AND EFFECTS OF COAL MINE NOISE ON PIT WORKERS**

I. G. Darlea, P. Bitir, and M. Coculescu *In its* The 4th Natl. Conf. on Acoustics, Vol. 1A (NASA-TT-F-15375) Jun. 1974 p 170-176 refs Transl. into ENGLISH from A 4-A Conferinta Nationala de Acustica, Vol. 1.A, Combaterea Zgomotului Si Vibratiilor, Bucharest, 29-31 May 1973 p 221-228

CSCL 05E

N74-28397* Kanner (Leo) Associates, Redwood City, Calif. **SOME ASPECTS OF SOUND DISCOMFORT CAUSED BY STREETCAR TRAFFIC**

C. Ursoniu, N. Puca, A. Dankner, G. Moise, and A. Sirbu *In its* The 4th Natl. Conf. on Acoustics, Vol. 1A (NASA-TT-F-15375) Jun. 1974 p 212-217 refs Transl. into ENGLISH from A 4-A Conferinta Nationala de Acustica, Vol. 1.A, Combaterea Zgomotului Si Vibratiilor, Bucharest, 29-31 May 1973 p 277-282

CSCL 05E

N74-28398* Kanner (Leo) Associates, Redwood City, Calif. **DATA ON THE ACOUSTIC COMFORT OF PASSENGERS IN RAILROAD CARS AND SOUNDPROOFING RECOMMENDATIONS**

Constantin Tomescu and Radu Vrsti *In its* The 4th Natl. Conf. on Acoustics, Vol. 1A (NASA-TT-F-15375) Jun. 1974 p 218-223 Transl. into ENGLISH from A 4-A Conferinta Nationala de Acustica, Vol. 1.A, Combaterea Zgomotului Si Vibratiilor, Bucharest, 29-31 May 1973 p 285-291

CSCL 05E

N74-28554*+ George Washington Univ., Washington, D.C. Sciences Communication Div.

SCIENTIFIC PUBLICATIONS AND PRESENTATIONS RELATING TO PLANETARY QUARANTINE. VOLUME 5: THE 1973 SUPPLEMENT

Frank D. Bradley Jun. 1974 68 p refs
(Grant NSR-09-010-027)
(NASA-CR-138898; GWU-SCD-74-14P-VOL-5) Avail: NTIS HC \$6.50 CSCL 06E

Documents concerning planetary quarantine are listed. Author and permuted title indexes are included for 282 citations. F.O.S.

N74-28556 Iowa Univ., Iowa City. **A MECHANICAL MODEL OF THE HUMAN LIGAMENTOUS SPINE AND ITS APPLICATION TO THE PILOT EJECTION PROBLEM** Ph.D. Thesis

Shiuan-Jau Chen 1973 162 p
Avail: Univ. Microfilms Order No. 74-16611

A three dimensional mechanical model of the human ligamentous spine is formulated. This model is suitable for use in both static and dynamic analyses. The physical system modeled includes not only the vertebral bodies and discs, but also the posterior spinal elements such as the ligaments and the facet joints. The discs are modeled as beam-column-rod elements with viscoelastic properties. The ligaments are modeled as viscoelastic strings. Each facet joint is modeled as a pair of two spherical or circular cylindrical surfaces connected by nonlinear elastic springs. The initial curves of the spine are also accounted for in the formulation. A two dimensional sagittal plane model consistent with the three dimensional model is used to analyze the pilot ejection problem. Numerical results show that the facet joints play an important role in transmitting forces within both the lumbar and lower thoracic regions.

Dissert. Abstr.

N74-28557*# Franklin Inst. Research Labs., Philadelphia, Pa.
TECHNIQUES DEVELOPMENT FOR WHALE MIGRATION TRACKING Final Report, Sep. - 30 Nov. 1973

R. M. Goodman, K. S. Norris (Calif. Univ., Santa Cruz), R. J. Gibson, R. Gentry (Calif. Univ., Santa Cruz), E. Dougherty, and L. Hobbs (Calif. Univ., Santa Cruz) 30 Nov. 1973 79 p (Contract NASw-2570) (NASA-CR-138830; F-C3748) Avail: NTIS HC \$7.00 CSCL 06C

Effort leading to the completion of development and fabrication of expansible whale harnesses and whale-carried instrument pods is described, along with details of the gear. Early preparative effort for a January-February 1974 field expedition is reported. Author

N74-28558*# State Univ. of New York, Buffalo. Center for Theoretical Biology.

THE MYXOMYCETES

Hanno Koppel Jun. 1972 27 p refs (Grant NGR-23-015-002)

(NASA-CR-138841) Avail: NTIS HC \$4.50 CSCL 06M

The classification, life cycle, morphology, and physiology of the class Myxomycetes (slime molds) are reported. Myxomyces culture, maintenance, and storage are discussed. E.H.W.

N74-28559# Kanner (Leo) Associates, Redwood City, Calif.
A COMPARISON OF THE EFFECTS OF SO₂, NO₂ AND O₃ ON THE PULMONARY VENTILATION: GUINEA PIG EXPOSURE EXPERIMENTS

Eiji Yokoyama Nov. 1973 11 p refs Transl. into ENGLISH from Sangyo Igaku (Japan), v. 11, no. 11, Nov. 1969 p 21-26 Sponsored by EPA

(APTIC-15680; TR-161-74) Avail: NTIS HC \$4.00

Comparative measurements were made of the pulmonary ventilation of guinea pigs before, during, and after exposure for two hours to SO₂ and to oxidants NO₂ (57 - 6ppm) and O₃. Each guinea pig was sealed from the neck down in a body plethysmograph. The gases were inhaled through a mask. In addition to the tidal volume and the frequency of respiration, the lung-chest air current resistance was also measured at 15-minute intervals by the sine wave pressurizing method. These gases all caused increases in the air current resistance of the guinea pigs, although there were differences in the degrees of changes. However, pronounced differences were observed between SO₂ on the one hand and NO₂ and O₃ on the other hand in the direction of the changes in the frequency of respiration. These results indicated that the dynamic behavior of the respiratory organs differed during exposure to SO₂ and during exposure NO₂ and O₃. In addition to these results, data concerning the rate of gas absorption in the detached upper respiratory tracts of animals and concerning the solubility in water indicate the possibility that most of the SO₂ is absorbed chiefly in the upper respiratory tract, while NO₂ and O₃ can penetrate deep into the lungs. Author

N74-28560*# Texas A&M Univ., College Station.
[AEROMONAS PROTEOLYRICA BACTERIA IN AEROSPACE ENVIRONMENTS] Final Progress Report

B. G. Foster May 1974 25 p

(Contract NAS9-11931)

(NASA-CR-134328) Avail: NTIS HC \$4.25 CSCL 06M

Preflight studies on *Aeromonas proteolytica* are reported to investigate the possibility of genetic alterations resulting in increased proteolysis in spacecraft environments. This organism may be present on human tissue and could pose medical problems if its endopeptidase and a hemolysin were to be produced in unusually high quantities or altered in such a way as to be more effective in their activities. Considered are: (1) Development of a nutritive holding medium for suspension of organisms; (2) the establishment of baseline information for the standardization of the assay for endopeptidase levels and hemolytic titers; (3) formulation of a method by which intracutaneous hemorrhage could be quantitated in guinea pig tissue; and (4) the responses of these organisms to parameters of spaceflight and experimentation. G.G.

N74-28561*# Old Dominion Univ. Research Foundation, Norfolk, Va.

STUDY OF BLOOD FORMING ORGAN DOSE AS A FUNCTION OF PROTON ENVIRONMENT Final Technical Report

G. S. Khandelwal Jun. 1974 7 p refs

(Contract NAS1-9434)

(NASA-CR-132475) Avail: NTIS HC \$4.00 CSCL 06P

It is demonstrated that a dosimeter which consists of four ion chambers, each with different wall thickness, is able to reproduce the BFO dose with reasonable accuracy. This generalized dosimetric system is only slightly more complex than dosimeters in current use. This preliminary development had two built-in assumptions: the isotropicity of the radiation and the neglect of nuclear reaction effects. Only the nuclear reaction effects have been calculated. Author

N74-28562*# Kanner (Leo) Associates, Redwood City, Calif.
HEMODYNAMICS IN OBESITY: A BRIEF REVIEW

H. Denolin Washington NASA Jul. 1974 9 p refs Transl. into ENGLISH from Bull. Physio-Pathol. Resp. (France), v. 8, Sep. - Oct. 1972 p 1005-1010

(Contract NASw-2481)

(NASA-TT-F-15826) Avail: NTIS HC \$4.00 CSCL 06P

Pulmonary arterial hypertension, reflecting left ventricular insufficiency, appears to be common in obese patients without significant alveolar hypoventilation. Isolated right ventricular hypertrophy is rare and chronic cor pulmonale is not usually a complication of simple obesity. Author

N74-28563*# Linguistic Systems, Inc., Cambridge, Mass.

ACUTE LUPUS ERYTHEMATOSUS WITH COMPLETE DEFICIENCY OF THE C₄ FRACTION OF COMPLEMENT

G. Hauptman, E. Grosshans, E. Heid, S. Mayer, and A. Bassat Washington NASA Jul. 1974 7 p refs Transl. into ENGLISH from Nouv. Presse Med. (France), v. 3, no. 14, 6 Apr. 1974 p 881-882

(Contract NASw-2482)

(NASA-TT-F-15727) Avail: NTIS HC \$4.00 CSCL 06E

A new symptom of acute disseminated lupus erythematosus and a complete heredity deficiency in one of the fractions of the complement were isolated. The subject was treated with cortisone and hydroxychloroquine and all the cutaneous lesions disappeared but the complement assays continue to show complete absence of C₄. Author

N74-28564*# Techtran Corp., Glen Burnie, Md.

LONG TERM EFFECT ON HIGH VACUUM ON MICRO-ORGANISMS

A. A. Imshenetskiy, C. B. Lysenko, B. F. Udovenko, and A. M. Bumenko Washington NASA Jul. 1974 7 p refs Transl. into ENGLISH from Mikrobiologiya (USSR), v. 42, no. 5, 1973 p 836-838

(Contract NASw-2485)

(NASA-TT-F-15720) Avail: NTIS HC \$4.00 CSCL 06M

The conidia of *Aspergillus terreus*, the spores of *Bacillus megaterium* and the vegetative cells of *Sarcina flava* were subjected to high vacuum. The combined action of high vacuum and low temperature for 500 hours failed to destroy these microorganisms. Author

N74-28565*# Techtran Corp., Glen Burnie, Md.

HUMAN CYTOMEGALOVIRUS (CMV) AND INDIRECT IMMUNOFLUORESCENCE IN DISSEMINATED LUPUS ERYTHEMATOSUS

Serge Montplaisir and Bernard Martineau Washington NASA Jul. 1974 6 p refs Transl. into ENGLISH from Can. J. Microbiol. (Ottawa), v. 20, no. 3, 1974 p 418-420

(Contract NASw-2485)

(NASA-TT-F-15712) Avail: NTIS HC \$4.00 CSCL 06E

An investigation was made of misleading results of test for cytomegalovirus infection. It was found that these infections may be conditioned by previous occurrence of disseminated Lupus erythematosus. Author

N74-28566*# Linguistic Systems, Inc., Cambridge, Mass.
THE EFFECT OF THREE DAY HYPODYNAMIA ON LIVER FUNCTION

D. I. Korotkov and P. O. Vyazitskiy Washington NASA Jul. 1974 7 p Transl. into ENGLISH from Voenno-Med. Zh. (USSR), no. 7, 1973 p 65-67 (Contract NASw-2482) (NASA-TT-F-15646) Avail: NTIS HC \$4.00 CSCL 06S

The effect of three day hypodynamia on liver function is studied. Seven subjects participated in a total of 16 tests, conducted with subjects sitting in chairs inclined at angles of 90 deg and 135 deg. The most extreme physiological arrangement, with respect to liver function, was with the chair back inclined at an angle of 105 deg. Author

N74-28567# Joint Publications Research Service, Arlington, Va.

SPACE BIOLOGY AND AEROSPACE MEDICINE, VOLUME 8, NO. 3, 1974

24 Jul. 1974 152 p refs Transl. into ENGLISH of Kosm. Biol. Aviakosm. Med. (Moscow), v. 8, no.3, 1974 p 1-90 (JPRS-62553) Avail: NTIS HC \$10.75

The effects of acceleration and radiation exposure on human and animal systems are studied by simulating space environment conditions

N74-28568 Joint Publications Research Service, Arlington, Va.
DOSIMETRIC INVESTIGATIONS ABOARD THE SALYUT ORBITAL SPACE STATION

V. I. Redko, S. B. Kozlova, V. V. Markelov, A. S. Stepanov, and I. V. Chernykh *In its Space Biol. and Aerospace Med.* Vol. 8, No. 3, 1974 (JPRS-62553) 24 Jul. 1974 p 1-6 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 8, no. 3, 1974 p 3-6

Dosimetric measurements of cosmic radiation were carried out aboard the Salyut orbital station using apparatus consisting of a telescope and two semiconductor detectors. The apparatus recorded fluxes to charged particles in several energy ranges and measured the linear energy transfer of these particles. The apparatus also included a tissue equivalent ionization chamber for ascertaining the absorbed dose. According to experimental data, the dose rate of the absorbed dose was 11 mrad/day, the dose rate of the equivalent dose was 13.4 mrem/day and the mean quality factor was 1.2. High energy protons made the principal contribution to the dose. This suggests that the distribution of the dose field within the station was more or less uniform. Author

N74-28569 Joint Publications Research Service, Arlington, Va.
EXPERIMENTAL DATA ON THE INFLUENCE OF IRRADIATION OF FOOD PRODUCTS BY PROTONS AND GAMMA RADIATION

V. P. Bychkov, M. I. Kozar, V. I. Popov, N. N. Boyko, Ye. V. Kolchin, O. S. Khokhlova, and V. V. Yurgov *In its Space Biol. and Aerospace Med.*, Vol. 8, No. 3, 1974 (JPRS-62553) 24 Jul. 1974 p 7-13 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 8, no. 3, 1974 p 8-10

Experimental findings on the effect of proton and gamma irradiation in doses of 1.5 and 7.0 x 10,000 rad on sunflower oil, vitamin concentrates, dry milk and dry brewer's yeast are reported. Also given are the results of a study of the amino acid composition, vitamin content and decomposition of these products with pancreatin and lipase *in vitro*. The irradiation of these products decreased the content of vitamins and decomposition of sunflower oil with lipase and deterioration of the organoleptic properties of irradiated milk during storage. Author

N74-28570 Joint Publications Research Service, Arlington, Va.
EFFECTIVENESS OF ADMINISTRATION OF AMYTETRAVITE AND ATP DURING PROLONGED IRRADIATION

V. D. Rogozkin, M. V. Tikhomirova, S. A. Davydova, L. M. Vodyakova, L. M. Ostroumova, and O. M. Atamanova *In its Space Biol. and Aerospace Med.*, Vol. 8, No. 3, 1974 (JPRS-

62553) 24 Jul. 1974 p 14-19 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 8, no. 3, 1974 p 11-14 (For availability see N74-28567 18-04)

In experiments on 109 dogs exposed to prolonged irradiation with a dose rate of 1 R/min the effectiveness of protection from long term administration of amytravite in combination with ATP was studied. Repeated preventive use of amytravite increasing the aspecific body resistance noticeably enhances the protective effect of ATP. This is manifested in an increase in the survival rate, a decrease in the severity of radiation sickness and a decline in the level of hematological changes in comparison with the effect of ATP administered alone. Combined treatment with ATP and amytravite, as well as with ATP alone, prevents an increase in the level of 11-hydroxycorticosteroids in the peripheral blood during the culmination of sickness which is typical of the control dogs. Author

N74-28571 Joint Publications Research Service, Arlington, Va.
STATE OF THE NEUROSECRETORY NUCLEI OF THE HYPOTHALAMUS AFTER COMBINED EXPOSURE TO ACCELERATION AND IONIZING RADIATION

L. A. Andrianova *In its Space Biol. and Aerospace Med.*, Vol. 8, No. 3, 1974 (JPRS-62553) 24 Jul. 1974 p 20-24 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow),

An analysis of the functional state of hypothalamic neurosecretory nuclei after combined exposure to accelerations and ionizing radiation revealed that the content of the neurosecretory substance in the neurons had changed. These changes were similar to those observed three hours after ionizing irradiation: a tendency to normalization of the antidiuretic activity of the plasma and accumulation of the secretion in neurons of nuclei in the anterior hypothalamus. Author

N74-28572 Joint Publications Research Service, Arlington, Va.
EFFECT OF THYROCALCITONIN ON WATER-MINERAL METABOLISM IN RABBITS DURING PROLONGED RESTRICTION OF MOBILITY

V. S. Shashkov, B. S. Dmitriyev, A. I. Volozhin, B. B. Yegorov, V. I. Lobachik, A. I. Briskin, L. I. Stekolnikov, D. D. Sumarovkov, V. N. Ivanov, K. K. Smirnov et al *In its Space Biol. and Aerospace Med.*, Vol. 8, No. 3, 1974 (JPRS-62553) 24 Jul. 1974 p 26-32 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 8, no. 3, 1974 p 18-22

Thirty day exposure of rabbits to hypokinesia results in an increased excretion of calcium, sodium and water, a decreased excretion of magnesium and a variable pattern of potassium excretion with the urine. The blood concentration of potassium changes insignificantly and that of magnesium tends to increase. On the 23d day of hypokinesia the animals exhibit a transient hyperkalemia and hypernatremia. Daily subcutaneous injections of thyrocalcitonin to hypokinetic rabbits leads to a decrease in calcium excretion with the urine and normalization of magnesium excretion. Thyrocalcitonin does not aggravate shifts in the water, sodium and potassium excretion of hypokinetic rabbits and induces no significant changes in the plasma concentration of electrolytes. Author

N74-28573 Joint Publications Research Service, Arlington, Va.
EFFECT OF RESTRICTED MOTOR ACTIVITY ON THE ENZYME SECRETION FUNCTION OF THE PANCREAS AND EXTRASECRETORY FUNCTION OF THE LIVER IN RATS

K. V. Smirnov, L. G. Goland, and I. L. Medkova *In its Space Biol. and Aerospace Med.*, Vol. 8, No. 3, 1974 (JPRS-62553) 24 Jul. 1974 p 33-40 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 8, no. 3, 1974 p 22-26

The enzyme secretion function of the pancreas and the external secretion function of rats were studied during different periods of their hypokinesia and recovery. The changes observed on the third day of hypokinesia, inhibition of amylolytic activity of the blood and tissue, increase in lipolytic activity and concentration of bile components, seem to be related to the stressor response

of the animal body to hypokinesia. The activity of pancreatic enzymes and secretion of bile components on the seventh and 15th days hypokinesia indicate a growing effect of hypokinesia. The recovery period is characterized by the difference in the changes of pancreatic enzymes and secretory function in the liver. This may be associated with metabolic changes occurring with a changeover to a regular environment. Author

N74-28574 Joint Publications Research Service, Arlington, Va. **ACCUMULATION OF QUINONES IN THE BODIES OF MICE DURING HYPEROXIA**

V. G. Golotin, A. D. Dobryakov, V. A. Gonenko, and I. I. Brekhman *In its Space Biol and Aerospace Med.*, Vol. 8, No. 3, 1974 (JPRS-62553) 24 Jul. 1974 p 41-46 refs Transl. into ENGLISH from *Kosm. Biol. Aviakosm. Med.* (Moscow), v. 8, no. 3, 1974 p 27-30

The effect of normoxic and hyperoxic pressure on mice was studied. Exposure of the animals to a pure oxygen atmosphere at 1 atm was accompanied by pathological changes in the lungs: an increase in volume, inflammation, etc. Eighty percent of the animals died on the sixth-eighth experimental days. This event coincided with a peak increase in the relative weight of the lungs. The content of quinones in the lungs of experimental animals gradually increased and on the third experimental day it was 30% more than that in the controls. The level of quinones in the liver was significantly lower in the experimental animals than in the controls and hemolytic activity of the extracts was absent throughout the experiment. Exposure of the animals to an oxygen atmosphere of 2.5 atm for 18 hours resulted in a decrease in red cell resistance, acid hemolysis, and death of the animals. Author

N74-28575 Joint Publications Research Service, Arlington, Va. **EFFECT OF IMIPRAMINE, NITRAZEPAM AND SODIUM HYDROXYBUTYRATE ON SLEEP IMPAIRMENTS CAUSED BY EMOTIONAL STRESS**

Yu. V. Burov and V. N. Zhukov *In its Space Biol. and Aerospace Med.*, Vol. 8, No. 3, 1974 (JPRS-62553) 24 Jul. 1974 p 47-52 refs Transl. into ENGLISH from *Kosm. Biol. Aviakosm. Med.* (Moscow), v. 8, no. 3, 1974 p 30-33

Avail: NTIS

Under the influence of emotional stress, cats exhibited a decrease in rapid eye movement (REM) sleep by 8-10% and an increase in NREM sleep, total sleep duration being slightly shortened. Administration of imipramine (1.5-6 mg/kg) and nitrazepam (0.1-1 mg/kg) following emotional stress enhanced disturbances in sleep phases. Under the influence of sodium hydroxybutyrate (100 mg/kg) the disturbed ratio between sleep phases was restored and total sleep duration increased in comparison with the control. Author

N74-28576 Joint Publications Research Service, Arlington, Va. **EXPERIMENT WITH THE INCORPORATION OF VEGETABLE PLANTS IN A SEMICLOSED LIFE SUPPORT SYSTEM**

I. A. Terskov, I. I. Gitelzon, B. G. Kovrov, G. M. Lisovskiy, Yu. N. Okladnikov, F. Ya. Sidko, V. N. Belyanin, and M. P. Shilenko *In its Space Biol. and Aerospace Med.*, Vol. 8, No. 3, 1974 (JPRS-62553) 24 Jul. 1974 p 53-58 refs Transl. into ENGLISH from *Kosm. Biol. Aviakosm. Med.* (Moscow), v. 8, no. 3, 1974 p 33-37

On the basis of a 30-day experiment with a closed man-Chlorella-vegetables life support system, it is concluded that the incorporation of nine vegetable species that meet human requirements for vegetables (for the most part) and oxygen (by one-fourth) caused no reciprocal inhibition of system components (if a bed of activated charcoal is placed after the algal component) and improved psychological perception of the environment. Author

N74-28577 Joint Publications Research Service, Arlington, Va. **PECULIARITIES OF THE CHEMICAL COMPOSITION OF GREEN PLANTS DURING THEIR PROLONGED CULTIVATION ON AN IONITE SUBSTRATE**

A. N. Bozhko, M. V. Vilyams, T. P. Alekhina, and A. L. Mashinskiy *In its Space Biol. and Aerospace Med.*, Vol. 8, No. 3, 1974

(JPRS-62553), v. 8, no. 3, 1974 p 37-39 refs Transl. into ENGLISH from *Kosm. Biol. Aviakosm. Med.* (Moscow), v. 8, no. 3, 1974 p 37-39

Data are presented that describe changes in the chemical composition of celery cabbage and garden cress grown on an ion exchange resin substrate, in a manned chamber. The content of the tested elements in plants varied with an increase in the time of substrate utilization. This indicates that the entry of individual elements into various plants changes as their concentration in the substrate decreases. This may result in variations in biomass chemical composition when a substrate consisting of ion exchange resins is used to cultivate plants in a conveyor system. Author

N74-28578 Joint Publications Research Service, Arlington, Va. **PSYCHOPHARMACOLOGICAL REGULATION OF INTERPERSONALITY RELATIONSHIPS IN A GROUP (EXPERIMENTAL INVESTIGATION)**

M. A. Novikov, A. A. Gerasimovich, G. V. Izosimov, T. V. Novikova, and F. N. Uskov *In its Space Biol. and Aerospace Med.*, Vol. 8, No. 3, 1974 (JPRS-62553) 24 Jul. 1974 p 63-68 refs Transl. into ENGLISH from *Kosm. Biol. Aviakosm. Med.* (Moscow), v. 8, no. 3, 1974 p 39-43

The influence of psychopharmacological preparations (aminazine, haloperidole, phenamine) on the distribution of functional duties within a group is studied by evaluating stability of habits and tactics, verbal communicability and the level of conflict tension, the psychological cost of group and individual activity, as well as empathic perception of the partner. It is shown that intra-group personality interactions can be controlled using psychopharmacological preparations. Author

N74-28579 Joint Publications Research Service, Arlington, Va. **EXPERT EVALUATION OF THE STATE OF THE NASAL SINUSES IN COSMONAUT CANDIDATES**

E. I. Matsnev and I. Ya. Yakovleva *In its Space Biol. and Aerospace Med.*, Vol. 8, no. 3, 1974 (JPRS-62553) 24 Jul. 1974 p 69-74 refs Transl. into ENGLISH from *Kosm. Biol. Aviakosm. Med.* (Moscow), v. 8, no. 3, 1974 p 43-47

The condition of the nasal sinuses was analyzed in 459 cosmonaut candidates in the age group 26-36 who underwent a special examination. Pathologies of the nasal sinuses were found in 75 subjects (16.3% of the total number). The pathologies included: cysts (30.7%), wall hyperplastic sinusitis (25.3%), catarrhal sinusitis (13.4%), polypous rhinosinusitis (5.3%), rhinosinusopathies (3.2%) and osteomas of the frontal sinuses (2.6%). Thirteen candidates, mostly with nonpurulent pathologies, exhibited susceptibility to allergy. Subjects with small nasal sinus cysts and subjects with mucous enlargements which are the result of earlier sinusitis, can be permitted to undergo training, provided that there are no concomitant dystrophic changes in the mucous membranes of the upper air passages, that they tolerate pressure gradients well and exhibit no allergy. Author

N74-28580 Joint Publications Research Service, Arlington, Va. **RESULTS OF EXAMINATION OF THE CREW OF THE SALYUT SPACE STATION IN A FUNCTIONAL TEST WITH CREATION OF NEGATIVE PRESSURE ON THE LOWER HALF OF THE BODY**

V. A. Degtyarev, V. G. Doroshev, N. D. Kalmykova, Z. A. Kirilova, Yu. A. Kukushkin, and N. A. Lapshina *In its Space Biol. and Aerospace Med.*, Vol. 8, No. 3, 1974 (JPRS-62553) 24 Jul. 1974 p 75-82 refs Transl. into ENGLISH from *Kosm. Biol. Aviakosm. Med.* (Moscow), v. 8, no. 3, 1974 p 47-52

Cosmonauts performed a functional LBNP test during the preflight period and on the 13th day of orbital flight. The cardiovascular responses during weightlessness were essentially similar to those at 1 g: an increase in the heart rate, a decrease in the stroke volume and cardiac output, a decrease in arterial pressure and in the ejection phase, an increase in pulse wave propagation velocity and peripheral resistance. During weightlessness these changes were more pronounced. At 1 g these responses followed the tests with a very marked decrease in negative pressure or orthostatic tolerance. Author

N74-28581 Joint Publications Research Service, Arlington, Va.
STUDY OF THE POSSIBILITY OF USE OF DECOMPRESSION OF THE LOWER BODY IN DIAGNOSIS OF BODY PREDISPOSITION TO A SYNCOPAL STATE

P. M. Suvorov, Yu. I. Bykova, and A. M. Maslov *In its Space Biol. and Aerospace Med.*, Vol. 8, No. 3, 1974 (JPRS-62553) 24 Jul. 1974 p 83-88 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 8, no. 3, 1974 p 53-56

The test subjects in the first experimental series were exposed to a negative pressure of 70 mm Hg. Eleven pilots who had histories of syncopal states tolerated LBNP as long as the 12 test subjects who exhibited vascular-vestibular instability and no syncopal states. In the second experimental series the test subjects were exposed to a negative pressure of 50 mm Hg. Healthy subjects tolerated the LBNP test for nine to 15-20 Minutes. Among the 23 persons who were susceptible to syncopal states, 60.1% exhibited a lower tolerance to LBNP than healthy subjects. The reason for the decline in the LBNP tolerance of many subjects susceptible to syncopal states is a decreased arterial tone which favors blood pooling in the lower body and a significant decrease in systolic volume. Author

N74-28582 Joint Publications Research Service, Arlington, Va.
CHARACTERISTICS OF THE IMMUNOLOGICAL STATE OF MAN DURING HYPOXIC HYPOXIA

T. N. Krupina, M. M. Korotayev, Ya. I. Pukhova, N. I. Tsyganova, and M. B. Reutova *In its Space Biol. and Aerospace Med.*, Vol. 8, No. 3, 1974 (JPRS-62553) 24 Jul. 1974 p 89-94 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 8, no. 3, 1974 p 56-60

Some indices of specific and aspecific immunoreactivity were studied in 52 healthy male subjects who remained at an elevation of 2,100-2,300 m for 30 days and regularly ascended to an elevation of 3,200 m. During hypoxic hypoxia humoral and cellular factors of immunobiological reactivity changed: phagocytic activity of the neutrophils and lysozyme activity of the serum increased significantly. The complementary activity of the serum increased significantly. The complementary activity of the blood serum exhibited no substantial changes. The properdin content decreased by the 25th day of the exposure. An examination of the specific antibodies to influenza viruses revealed a decrease in the developed antiviral immunity in some subjects. This was confirmed by the appearance of mild respiratory infection in five test subjects. Author

N74-28583 Joint Publications Research Service, Arlington, Va.
PECULIARITIES OF THE NYSTAGMIC REACTION IN HUMAN SUBJECTS AFTER EXPOSURE TO LINEAR ACCELERATION

B. I. Polyakov *In its Space Biol. and Aerospace Med.*, Vol. 8, No. 3, 1974 (JPRS-62553) 24 Jul. 1974 p 95-101 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 8, no. 3, 1974 p 60-63

Different parameters of post-nystagmus induced by Coriolis accelerations before and 11-49 minutes after centrifuging (4-6 g) with cabin counterrotation were compared. A significant change in the nystagmic pattern was observed in seven of fourteen observations. A decrease in the maximum velocity of the slow phase was predominant. The possible mechanisms of the effect are interpreted from the point of view of cupular-otolith interactions and extralabyrinthal effects. Author

N74-28584 Joint Publications Research Service, Arlington, Va.
MAN'S MINERAL BALANCE DURING TEN-DAY CONFINEMENT AT A CONSTANT AMBIENT TEMPERATURE OF 40 DEG

O. A. Virovats, R. K. Kiselev, N. A. Lapshina, P. Ya. Azhevskiy, V. N. Shustova, and L. G. Golovkin *In its Space Biol. and Aerospace Med.*, Vol. 8, No. 3, 1974 (JPRS-62553) 24 Jul. 1974 p 102-109 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 8, no. 3, 1974 p 64-68

Sodium and potassium excretions in the urine and perspiration were studied in man kept for 10 days at a constant temperature of 40 deg. By the end of the experiment the test subjects had lost about 30% of their total body sodium. Electrolyte losses did not affect thermal tolerance and deteriorated cardiovascular functions. Sodium supplements to the diet did not alter potassium excretion. Author

N74-28585 Joint Publications Research Service, Arlington, Va.
INVESTIGATION OF THE STATE OF HUMAN LIPID METABOLISM IN SEALED CHAMBERS

O. S. Khokhlova *In its Space Biol. and Aerospace Med.*, Vol. 8, No. 3, 1974 p 110-116 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 8, no. 3, 1974 p 69-73

The lipid metabolism (the content of total lipids, total esterified and free cholesterol and the percentage of its esterification, the content of phosphorus in phospholipids, percentage of alpha and beta lipoproteins), was studied in the blood serum of 16 healthy male subjects confined to pressurized chambers subjects consumed diets designed for one-month space missions. These consumed diets did not bring about noticeable changes in the mentioned parameters of lipid metabolism. An altered diurnal rhythm caused a significant increase in the content of total lipids, cholesterol and beta-lipoproteins. Author

N74-28586 Joint Publications Research Service, Arlington, Va.
INVESTIGATION OF ASSIMILABILITY OF AMINO ACIDS BY MAN RECEIVING AN AMINO ACID MIXTURE

V. G. Vysotskiy, T. F. Vlasova, and O. V. Kandaurova *In its Space Biol. and Aerospace Med.*, Vol. 8, No. 3, 1974 (JPRS-62553) 24 Jul. 1974 p 117-121 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 8, no. 3, 1974 p 73-76

Human assimilability of individual amino acids was tested by replacing the protein component in the diet by an equivalent mixture of pure amino acids. Tests carried out with 16 subjects for a period of 45 days revealed that the replacement of casein in the food ration by an equivalent mixture of L-amino acids produced a reliable increase in the assimilability of most amino acids. This is evidence of the nonidentity of the human reaction to polymer and monomer protein nutrition. Author

N74-28587 Joint Publications Research Service, Arlington, Va.
KINEMATIC CHARACTERISTICS OF MOTION OF THE HUMAN HEAD IN DIFFERENT PLANES

V. N. Krutko and A. A. Shipov *In its Space Biol. and Aerospace Med.*, Vol. 8, No. 3, 1974 (JPRS-62553) 24 Jul. 1974 p 122-124 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 8, no. 3, 1974 p 77-78

Clarification of man's capacity for performing different movements of the head is of great importance in determining the possibilities of tracking moving objects, making readings on control panel instruments, etc. The characteristics of temporal change in the angles and rates of rotation and their limiting values during motions of the head in the horizontal, sagittal, and frontal planes were studied. Despite retention of the general development of rotation with time, the amplitude and temporal parameters of movements in different planes differed from one another, as was manifested particularly clearly in the case of the most rapid movements. It was found that the head is more mobile in the horizontal plane than in the sagittal and frontal planes. Author

N74-28588 Joint Publications Research Service, Arlington, Va.
ULTRAVIOLET FLUORESCENCE OF MYELOID CELLS IN THE BONE MARROW OF DOGS EXPOSED TO CHRONIC RADIATION

S. N. Aleksandrov, V. G. Safronova, and A. S. Yagunov *In its Space Biol. and Aerospace Med.*, Vol. 8, No. 3, 1974 (JPRS-62553) 24 Jul. 1974 p 125-127 refs Transl. into ENGLISH from Kosm. Biol. Aviakosm. Med. (Moscow), v. 8, no. 3, 1974 p 78-79

The results of experiments on dogs subjected to chronic

irradiation in a low intensity dose agree with the data obtained earlier with rats subjected to acute radiation. With both objects under different irradiation conditions it was established that the radiation changes determining the increase in the intensity of UVF of bone marrow cells, and possibly other types of somatic cells, are transmitted in the sexual multiplication of animals and attain a mass appearance, although impairments in the genetic determinants causing them are in a heterozygotic state. Author

N74-28589 Joint Publications Research Service, Arlington, Va. **EFFECTS OF VITAMINS ON THE PENETRATION OF LIPOATE-S SUP 35 INTO THE CELLS OF ANIMALS SUBJECTED TO ACCELERATION**

V. N. Totskiy *In its Space Bio. and Aerospace Med.*, Vol. 8, No. 3, 1974 (JPRS-62553) 24 Jul. 1974 p 128-129 refs Transl. into ENGLISH from *Kosm. Biol. Aviakosm. Med. (Moscow)*, v. 8, no. 3, 1974 p 80

The erythrocytes of rats weakly hold the absorbed lipoate when they are washed with a physiological solution. The blood cells of rats and doves subjected to acceleration bind considerably greater quantities of lipoate-S-35 in comparison with the controls and with ease lose this vitamin during washings; this indicates an increased permeability of the cell membranes after acceleration. The vitamins added to the incubation medium exert little influence on the degree of absorption of the lipoate by the erythrocytes of white rats, but to a considerable degree decrease the level of the radioactivity in blood cells of doves. A particularly clearly expressed decrease in the absorption of lipoate S-35 by erythrocytes occurs under the influence of pantothenate and the mixture of tested vitamins. Author

N74-28590 Joint Publications Research Service, Arlington, Va. **DISCOVERY OF AMINO ACIDS IN REGIONS OF PRESENT-DAY VOLCANIC ACTIVITY**

L. M. Mukhin and V. I. Kalinichenko *In its Space Biol. and Aerospace Med.*, Vol. 8, No. 3, 1974 (JPRS-62553) 24 Jul. 1974 p 130-132 ref Transl. into ENGLISH from *Kosm. Biol. Aviakosm. Med. (Moscow)*, v. 8, no. 3, 1974 p 80-82

Analyses of hydrothermal waters for amino acids in regions of active volcanism are reported. Thin layer chromatography was used on samples in the form of a condensate taken from the crater lake of Malyy Semyachek volcano, from the boiling lake in the caldera of Golovin volcano, from springs and boreholes associated with the hydrothermal systems on Puzhetka, Alasov and Kunashir Islands. A series of parameters characterizing the samples makes it possible to postulate that at least some of the discovered amino acids are nonbiologically synthesized and cannot be a product of degradation of microflora. This hypothesis is supported primarily by the high temperature, the considerable depth at which some samples were taken, the unusually high concentrations, and also the hypothetical presence of such a rare acid as sarcosine. Author

N74-28591 Joint Publications Research Service, Arlington, Va. **OXYGEN CONSUMPTION BY RATS DURING PROLONGED BREATHING OF AN ATMOSPHERE WITH AN INCREASED CARBON DIOXIDE CONTENT**

I. R. Kalinichenko *In its Space Biol. and Aerospace Med.*, Vol. 8, No. 3, 1974 (JPRS-62553) 24 Jul. 1974 p 133-135 refs Transl. into ENGLISH from *Kosm. Biol. Aviakosm. Med. (Moscow)*, v. 8, no. 3, 1974 p 82-83

Carbon dioxide effects in decreasing the intensity of oxidation processes in tissues were tested on rats exposed to stipulated parameters of carbon dioxide concentrations in a controlled breathing atmosphere. Observed were behavioral reactions of the animals, weight change, respiration rate, oxygen consumption, and other indices. It was found that breathing of gas mixtures containing increasing carbon dioxide concentrations increased frequency and depth of the respiration and at the same time decreased oxygen consumption. G.G.

N74-28592 Joint Publications Research Service, Arlington, Va. **INFLUENCE OF FUNCTIONAL LOADS ON THE STATE OF THE PHAGOCYtic FUNCTION OF BLOOD IN DOGS SUBJECTED TO CHRONIC GAMMA-IRRADIATION**

V. M. Shilov, B. A. Markelov, and S. I. Palmira *In its Space Biol. and Aerospace Med.*, Vol. 8, No. 3, 1974 (JPRS-62553) 24 Jul. 1974 p 136-140 refs Transl. into ENGLISH from *Kosm. Biol. Aviakosm. Med. (Moscow)*, v. 8, no. 3, 1974 p 83-85

The influence of a physical load and the introduction of foreign protein and phagocytic reaction of the blood in dogs subjected to chronic irradiation were studied. The administration of foreign protein made it possible to detect an impairment in the compensatory possibilities of the body. In control animals with a fully adequate phagocytic function of the leukocytes in response to the administration of heterogeneous gamma globulin there was a considerable activation of the phagocytic reaction. The administration of gamma globulin to irradiated animals with an impaired function of the phagocytes led to a marked decrease in the phagocytic activity of the leukocytes or inhibition of the protective reaction. In a comparison of the data obtained using both functional loads, there was found to be a coincidence in the nature of changes in the phagocytic reaction to a physical load and the administration of gamma globulin. A distinct dependence of the phagocytic function of leukocytes on body reactivity is detected under these circumstances. Author

N74-28593 Joint Publications Research Service, Arlington, Va. **REACTIONS OF SPINAL CORD INTERNEURONS OF DELABYRINTHECTOMIZED CATS DURING OSCILLATION**

A. V. Mokrousova *In its Space Biol. and Aerospace Med.*, Vol. 8, No. 3, 1974 (JPRS-62553) 24 Jul. 1974 p 141-144 refs Transl. into ENGLISH from *Kosm. Biol. Aviakosm. Med. (Moscow)*, v. 8, no. 3, 1974 p 86-88

The nature of rhythmic activity was studied on the spinal cord interneurons of delabyrinthectomized cats during oscillation since the descending control of movements (especially, vestibular-spinal reactions) in intact animals was caused by specifically these spinal cord elements. The results of these experiments show that deactivation of the receptors of the vestibular apparatus in cats does not suppress completely the reactions of spinal cord interneurons associated with stand motion. Seventy-nine percent of the neurons continued to react to the oscillation. This makes it possible to assume that the reactions of the interneurons to accelerations arising during oscillation are determined to a considerable degree by extralabyrinthal reception. Author

N74-28594 Joint Publications Research Service, Arlington, Va. **THERMAL TOLERANCE OF BLOOD SERUM IN DOGS SUBJECTED TO COMBINED EXPOSURE TO X-RADIATION AND REDUCED BAROMETRIC PRESSURE**

A. A. Vashuk *In its Space Biol. and Aerospace Med.*, Vol. 8, No. 3, 1974 (JPRS-62553) 24 Jul. 1974 p 145-147 refs Transl. into ENGLISH from *Kosm. Biol. Aviakosm. Med. (Moscow)*, v. 8, no. 3, 1974 p 88-90

Exposure of unirradiated dogs to reduced barometric pressure generally caused a reliable decrease in the time of thermal blood coagulation of a relatively brief nature. Irradiation of the dogs produced a significant increase in thermal stability; the coagulation time increased monotonically and reached a maximum 13 to 20 days after irradiation. Combined exposure to radiation and reduced pressure provided a clearly expressed increase in thermal stability of the serum from the third day after irradiation. G.G.

N74-28595*# Stanford Univ., Calif. Integrated Circuits Lab. **ULTRASONIC DOPPLER MEASUREMENT OF RENAL ARTERY BLOOD FLOW** Semiannual Report, 1 Sep. 1973 - 28 Feb. 1974

Jul. 1974 20 p refs

(Grant NGR-05-020-615)

(NASA-CR-138902) Avail: NTIS HC \$4.00 CSCL 06P

Implantable pulsed Doppler ultrasonic flowmeter development has resulted in designs for application to the aortas of

dogs and humans, and to human renal and coronary arteries. A figure of merit was derived for each design, indicating the degree of its precision. An H-array design for transcutaneous observation of blood flow was developed and tested in vitro. Two other simplified designs for the same purpose obviate the need to determine vessel orientation. One of these will be developed in the next time period. Techniques for intraoperative use and for implantation have had mixed success. While satisfactory on large vessels, higher ultrasonic frequencies and alteration of transducer design are required for satisfactory operation of pulsed Doppler flowmeters with small vessels. Author

N74-28596* # Scripta Technica, Inc., Washington, D.C.
STUDIES IN GEOMAGNETISM, AERONOMY AND SOLAR PHYSICS (PROBLEMS OF HELIOBIOLOGY AND THE BIOLOGICAL EFFECT OF MAGNETIC FIELDS)

A. T. Platonova, ed. NASA Jan. 1974 202 p refs Transl. into ENGLISH of the book "Issledovaniya po Geomagnetizmu, Aeronomii i Fizike Solntsa (Voprosy Geliobiologii i Biologicheskogo Deystviya Magnitnykh Poley)" Moscow, Nauka Press, no. 17, 1971 p 1-174

(Contract NASw-2484)

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Statistical correlation methods are used to reveal effects of solar activity and magnetic fields on biological processes in humans and animals.

N74-28597* Scripta Technica, Inc., Washington, D.C.
HELIOBIOLOGY, ITS DEVELOPMENT, SUCCESSES AND TASKS

A. T. Platonova *In its Studies in Geomagnetism, Aeronomy and Solar Phys.* (NASA-TT-F-15862) Jan. 1974 p 1-8 Transl. into ENGLISH from the book "Issledovaniya po Geomagnetizmu, Aeronomii i Fizike Solntsa (Voprosy Geliobiologii i Biologicheskogo Deystviya Magnitnykh Poley)" Moscow, Nauka Press, No. 17, 1971 p 3-9

CSDL 06C

Heliobiology studies the influence of changes in solar activity on life. Considered are the influence of periodic solar activity on the development and growth of epidemics, mortality from various diseases, the functional activity of the nervous system, the development of psychic disturbances, the details of the development of microorganisms and many other phenomena in the living world. Author

N74-28598* Scripta Technica, Inc., Washington, D.C.
NOTES ON THE CONCEPT OF NORMAL VALUES EMPLOYED IN CLINICAL PRACTICE

A. T. Platonova *In its Studies in Geomagnetism, Aeronomy and Solar Phys.* (NASA-TT-F-15862) Jan. 1974 p 9-11 Transl. into ENGLISH from the book "Issledovaniya po Geomagnetizmu, Aeronomii i Fizike Solntsa (Voprosy Geliobiologii i Biologicheskogo Deystviya Magnitnykh Poley)" Moscow, Nauka Press, no. 17, 1971 p 10-12

CSDL 06E

The question of the considerable variations in various blood parameters under the influence of changes in environmental factors is discussed. Recommendations are given that so-called normal values should be given special attention. Fibrinolytic and fibrinogenolytic activity studies on the blood in healthy human beings revealed significant differences for individual months and even on specific days. Changes in the activity of fibrinolysis and fibrinogenolysis show a correlation with changes in the meteorological conditions, seasonal variations and changes in solar activity. Author

N74-28599* Scripta Technica, Inc., Washington, D.C.
INFLUENCE OF SOLAR ACTIVITY ON FIBRINOLYSIS AND FIBRINOGENOLYSIS

V. I. Marchenko *In its Studies in Geomagnetism, Aeronomy and Solar Phys.* (NASA-TT-F-15862) Jan. 1974 p 12-15 refs Transl. into ENGLISH from the book "Issledovaniya po Geomagnetizmu, Aeronomii i Fizike Solntsa (Voprosy Geliobiologii i Biologicheskogo Deystviya Magnitnykh Poley)" Moscow, Nauka

Press, no. 17, 1971 p 13-15

CSDL 06P

During periods of high solar activity fibrinolysis and fibrinogenolysis are increased. A direct correlative relationship is established between the indices of fibrinolysis, fibrinogenolysis and solar flares which were recorded two days before the blood was collected for analysis. Author

N74-28600* Scripta Technica, Inc., Washington, D.C.
FIBRINOLYSIS AND FIBRINOGENOLYSIS ON MAGNETICALLY-ACTIVE DAYS

V. I. Marchenko *In its Studies in Geomagnetism, Aeronomy and Solar Phys.* (NASA-TT-F-15862) Jan. 1974 p 16-20 refs Transl. into ENGLISH from the book "Issledovaniya po Geomagnetizmu, Aeronomii i Fizike Solntsa (Voprosy Geliobiologii i Biologicheskogo Deystviya Magnitnykh Poley)" Moscow, Nauka Press, no. 17, 1971 p 17-22

CSDL 06P

On magnetically-active days, activation of fibrinolysis and fibrinogenolysis is observed. The increase in fibrinolysis and fibrinogenolysis begins on the day of the onset of a magnetic storm, reaching a maximum in 24 hours. Activation is higher on days with magnetic storms with a sudden onset and a C index of 1.5-2.0. Author

N74-28601* Scripta Technica, Inc., Washington, D.C.
INFLUENCE OF SYNOPTIC PROCESSES ON FIBRINOLYSIS AND FIBRINOGENOLYSIS IN HEALTHY PERSONS

V. I. Marchenko *In its Studies in Geomagnetism, Aeronomy and Solar Phys.* (NASA-TT-F-15862) Jan. 1974 p 20-23 refs Transl. into ENGLISH from the book "Issledovaniya po Geomagnetizmu, Aeronomii i Fizike Solntsa (Voprosy Geliobiologii i Biologicheskogo Deystviya Magnitnykh Poley)" Moscow, Nauka Press, no. 17, 1971 p 22-24

CSDL 06P

It is shown that on days with frontal activity in the atmosphere the levels of fibrinolysis and fibrinogenolysis are increased. The reactions of fibrinolysis and fibrinogenolysis to the passage of warm and cold fronts varies with the season of the year. Author

N74-28602* Scripta Technica, Inc., Washington, D.C.
THE INFLUENCE OF WEATHER ON FIBRINOLYSIS AND FIBRINOGENOLYSIS

V. I. Marchenko *In its Studies in Geomagnetism, Aeronomy and Solar Phys.* (NASA-TT-F-15862) Jan. 1974 p 24-30 refs Transl. into ENGLISH from the book "Issledovaniya po Geomagnetizmu, Aeronomii i Fizike Solntsa (Voprosy Geliobiologii i Biologicheskogo Deystviya Magnitnykh Poley)" Moscow, Nauka Press, no. 17, 1971 p 24-31

CSDL 06P

Analysis of fibrinolysis and fibrinogenolysis indices by month showed an increase in the activity of these processes from winter to summer (1967-1968). At all seasons of the year, fibrinolysis and fibrinogenolysis increase during weather of the cyclonic type with passage of fronts and sharp fluctuations in meteorological factors in the atmosphere. Author

N74-28603* Scripta Technica, Inc., Washington, D.C.
RESULTS OF COMPARISON OF THE DYNAMICS OF THE EPIDEMIC PROCESS WITH CHANGES IN THE PLANETARY INDEX OF MAGNETIC DISTURBANCE

V. N. Yagodinskiy *In its Studies in Geomagnetism, Aeronomy and Solar Phys.* (NASA-TT-F-15862) Jan. 1974 p 31-38 refs Transl. into ENGLISH from the book "Issledovaniya po Geomagnetizmu, Aeronomii i Fizike Solntsa (Voprosy Geliobiologii i Biologicheskogo Deystviya Magnitnykh Poley)" Moscow, Nauka Press, no. 17, 1971 p 32-38

CSDL 06E

Possible pathways for the action of factors related to solar activity and its magnetic effects on the epidemic process are discussed. Author

N74-28604* Scripta Technica, Inc., Washington, D.C.
THE PROBLEM OF THE PERIODICITY OF THE EPIDEMIC PROCESS

V. N. Yagodinskiy, Z. P. Konovalenko, and I. P. Druzhinin *In its Studies in Geomagnetism, Aeronomy and Solar Phys.* (NASA-TT-F-15862) Jan. 1974 p 39-48 refs Transl. into ENGLISH from the book "Issledovaniya po Geomagnetizmu, Aeronomii i Fizike Solntsa (Voprosy Geliobiologii i Biologicheskogo Deystviya Magnitnykh Poley)" Moscow, Nauka Press, no. 17, 1971 p 39-45

CSSL 06E

An analysis of data from epidemics makes it possible to determine their principal causes, governed by environmental factors (solar activity, etc.) The results of an analysis of the periodicity of the epidemic process in the case of diphtheria are presented which was conducted with the aid of autocorrelation and spectral methods of analysis. Numerical data (annual figures) are used on the dynamics of diphtheria in 50 regions (points) with a total duration of 2,777 years. Author

N74-28605* Scripta Technica, Inc., Washington, D.C.
STATISTICAL EVALUATION OF THE SIGNIFICANCE OF THE INFLUENCE OF ABRUPT CHANGES IN SOLAR ACTIVITY ON THE DYNAMICS OF THE EPIDEMIC PROCESS

I. P. Druzhinin, N. V. Khamyanova, and V. N. Yagodinskiy *In its Studies in Geomagnetism, Aeronomy and Solar Phys.* (NASA-TT-F-15862) Jan. 1974 p 49-58 ref Transl. into ENGLISH from the book "Issledovaniya po Geomagnetizmu, Aeronomii i Fizike Solntsa (Voprosy Geliobiologii i Biologicheskogo Deystviya Magnitnykh Poley)" Moscow, Nauka Press, no. 17, 1971 p 47-55

CSSL 06E

Statistical evaluations of the significance of the relationship of abrupt changes in solar activity and discontinuities in the multi-year pattern of an epidemic process are reported. They reliably (with probability of more than 99.9%) show the real nature of this relationship and its great specific weight (about half) in the formation of discontinuities in the multi-year pattern of the processes in question. Author

N74-28606* Scripta Technica, Inc., Washington, D.C.
REACTIONS OF THE NERVOUS SYSTEM TO MAGNETIC FIELDS

Yu. A. Kholodov *In its Studies in Geomagnetism, Aeronomy and Solar Phys.* (NASA-TT-F-15862) Jan. 1974 p 59-72 refs Transl. into ENGLISH from the book "Issledovaniya po Geomagnetizmu, Aeronomii i Fizike Solntsa (Voprosy Geliobiologii i Biologicheskogo Deystviya Magnitnykh Poley)" Moscow, Nauka Press, no. 17, 1971 p 56-68

CSSL 06P

This magnetobiological survey considers sensory, nervous, stress and genetic effects of magnetic fields on man and animals. It is shown that the nervous system plays an important role in the reactions of the organism to magnetic fields: the final biological effect is a function of the strength of the magnetic fields, the gradient, direction of the lines of force, duration and location of the action, and the functional status of the organism. G.G.

N74-28607* Scripta Technica, Inc., Washington, D.C.
EFFECT OF A MAGNETIC FIELD OF EXTREMELY LOW INTENSITY ON THE COAGULATORY SYSTEM OF THE BLOOD

L. V. Zabrodina *In its Studies in Geomagnetism, Aeronomy and Solar Phys.* (NASA-TT-F-15862) Jan. 1974 p 73-81 refs Transl. into ENGLISH from the book "Issledovaniya po Geomagnetizmu, Aeronomii i Fizike Solntsa (Voprosy Geliobiologii i Biologicheskogo Deystviya Magnitnykh Poley)" Moscow, Nauka Press, no. 17, 1971 p 69-76

CSSL 06P

The influence of a magnetic field of 10,000 gamma on the conditions of the coagulatory system of rabbits was studied. The results from a number of experiments indicate that the action of a very weak magnetic field produces an increase in the coagulatory activity of the blood. Author

N74-28608* Scripta Technica, Inc., Washington, D.C.
THE INFLUENCE OF A CONSTANT MAGNETIC FIELD ON THE COAGULATORY SYSTEM OF THE BLOOD IN AN EXPERIMENT

L. V. Zabrodina *In its Studies in Geomagnetism, Aeronomy and Solar Phys.* (NASA-TT-F-15862) Jan. 1974 p 82-96 refs Transl. into ENGLISH from the book "Issledovaniya po Geomagnetizmu, Aeronomii i Fizike Solntsa (Voprosy Geliobiologii i Biologicheskogo Deystviya Magnitnykh Poley)" Moscow, Nauka Press, no. 17, 1971 p 77-89

CSSL 06P

The influence of a constant magnetic field with a strength of 2500 oersteds on the coagulatory system of the blood in rabbits was studied; the animals were subjected to this field for one and five hours. The magnetic field acts on the coagulatory system of the blood after only one hour exposure. Repeated 5-hour exposures cause activation of the anticoagulatory system in the blood and causes distinctive effects on the subsequent changes in the coagulatory system of the blood. It is quite likely that in this instance the adaptational properties of the organism make themselves felt. Author

N74-28609* Scripta Technica, Inc., Washington, D.C.
REPEATED ACTION OF A CONSTANT MAGNETIC FIELD ON THE BLOOD COAGULATION SYSTEM IN ARTIFICIALLY PRODUCED ANEMIA

L. V. Zabrodina *In its Studies in Geomagnetism, Aeronomy and Solar Phys.* (NASA-TT-F-15862) Jan. 1974 p 97-108 refs Transl. into ENGLISH from the book "Issledovaniya po Geomagnetizmu, Aeronomii i Fizike Solntsa (Voprosy Geliobiologii i Biologicheskogo Deystviya Magnitnykh Poley)" Moscow, Nauka Press, no. 17, 1971 p 90-98

CSSL 06P

Changes are discussed in the coagulatory system of the blood in rabbits under the influence of a constant magnetic field of an intensity of 2500 oersteds against the background of artificially induced anemia. Reversibility of the changes produced and the presence of the adaptational effect are noted. Taking all this into consideration, the changes involving the coagulatory system of the blood which arise under the influence of a constant magnetic field may be considered to have a nerve-reflex nature. Author

N74-28610* Scripta Technica, Inc., Washington, D.C.
CHANGE IN BLOOD COAGULATION INDICES AS A FUNCTION OF THE INCUBATION PERIOD OF PLASMA IN A CONSTANT MAGNETIC FIELD

S. G. Yepishina *In its Studies in Geomagnetism, aeronomy and Solar Phys.* (NASA-TT-F-15862) Jan. 1974 p 109-116 Transl. into ENGLISH from the book "Issledovaniya po Geomagnetizmu, Aeronomii i Fizike Solntsa (Voprosy Geliobiologii i Biologicheskogo Deystviya Magnitnykh Poley)" Moscow, Nauka Press, no. 17, 1971 p 99-104

CSSL 06P

The influence of a constant magnetic field (CMF) with a strength of 250 and 2500 oersteds on the recalcification reaction and the tolerance of plasma to heparin was studied as a function of the exposure time of the plasma to the CMF. The maximum and reliable change in the activation of the coagulatory system of the blood was observed after a 20-hour incubation of the plasma in a CMF. As the exposure time increased, the recalcification reaction changed insignificantly; the difference between the mean arithmetic of the experiment and control values was not statistically reliable. The tolerance of the plasma to heparin as a function of the exposure time to the CMF of the plasma was considerably modified, and was statistically reliable. Author

N74-28611* Scripta Technica, Inc., Washington, D.C.
CHANGE IN FIBRINOLYTIC ACTIVITY UNDER THE INFLUENCE OF A CONSTANT MAGNETIC FIELD

S. G. Yepishina *In its Studies in Geomagnetism, Aeronomy and Solar Phys.* (NASA-TT-F-15862) Jan. 1974 p 117-123 Transl. into ENGLISH from the book "Issledovaniya po Geomagnetizmu, Aeronomii i Fizike Solntsa (Voprosy Geliobiologii i Biologicheskogo Deystviya Magnitnykh Poley)" Moscow, Nauka Press, no. 17, 1971 p 104-112 18-04)

CSSL 06P

The fibrinolytic activity of plasma changes under the influence of a constant magnetic field (CMF) with a strength of 250 or 2500 oersteds. CMF shows a tendency toward normalization of fibrinolytic processes in the presence of pathological disturbances in fibrinolysis activation. Author

N74-28612* Scripta Technica, Inc., Washington, D.C.
INFLUENCE OF A CONSTANT AND VARIABLE MAGNETIC FIELD ON THE COAGULATION OF HUMAN BLOOD IN VITRO AND IN VIVO

I. L. Degen and V. Ya. Plaksenko *In its Studies in Geomagnetism, Aeronomy and Solar Phys.* (NASA-TT-F-15862) Jan. 1974 p 124-128 refs Transl. into ENGLISH from the book "Issledovaniya po Geomagnetizmu, Aeronomii i Fizike Solntsa (Voprosy Geliobiologii i Biologicheskogo Deystviya Magnitnykh Poley)" Moscow, Nauka Press, no. 17, 1971 p 113-116

CSSL 06P

The influence of constant and varying magnetic fields on the coagulation of the blood was studied in experiments performed in vitro and in vivo. In the in vitro tests it was found that a constant magnetic field with a strength of 100 or 200 oersteds influences the coagulation of the blood, retarding it in some cases and speeding up the coagulation time in others. In the in vivo studies, both retarding and accelerating effects were likewise observed with respect to the coagulation of the blood, but the nature of the change was a function of the background. A normalizing effect of the magnetic field on the coagulation of the blood was observed. Author

N74-28613* Scripta Technica, Inc., Washington, D.C.
METHOD OF MAGNETOBIOLOGICAL INDICATION IN CLINICAL LABORATORY PRACTICE

A. V. Sosunov, V. M. Dubova, Yu. S. Parfenov, L. D. Piksina, F. O. Borisov, and L. N. Semenov *In its Studies in Geomagnetism, Aeronomy and Solar Phys.* (NASA-TT-F-15862) Jan. 1974 p 129-140 refs Transl. into ENGLISH from the book "Issledovaniya po Geomagnetizmu, Aeronomii i Fizike Solntsa (Voprosy Geliobiologii i Biologicheskogo Deystviya Magnitnykh Poley)" Moscow, Nauka Press, no. 17, 1971 p 117-128

CSSL 06E

Data are presented on the use of the method of magnetobiological indication for defining the immunobiological state of patients with very serious diseases. It has been found that the enzymes of a patient react more sensitively to the energy from a magnetic field. It is important that the magnetoreactivity of the enzymes, like the cell forms of the blood in the patients, have a certain relationship to the clinical-nosological forms and the dynamics of the illness of the subject. Author

N74-28614* Scripta Technica, Inc., Washington, D.C.
INFLUENCE OF A CONSTANT MAGNETIC FIELD ON THROMBOCYTES

Ye. A. Meyerova *In its Studies in Geomagnetism, Aeronomy and Solar Phys.* (NASA-TT-F-15862) Jan. 1974 p 141-147 refs Transl. into ENGLISH from the book "Issledovaniya po Geomagnetizmu, Aeronomii i Fizike, Solntsa (Voprosy Geliobiologii i Biologicheskogo Deystviya Magnitnykh Poley)" Moscow, Nauka Press, no. 17, 1971 p 129-135

CSSL 06C

In an experiment on white mice it was found that a constant electromagnetic field with strength of 250-275 oersteds is biologically active at an exposure of 55 minutes. Qualitative

and morphological changes in thrombocytes 1-3 days following exposure reduced their numbers, prolonged blood coagulation time and increased the number of leucocytes. Author

N74-28615* Scripta Technica, Inc., Washington, D.C.
THE PROTECTIVE EFFECT OF A CONSTANT MAGNETIC FIELD

A. V. Sosunov and A. N. Tripuzov *In its Studies in Geomagnetism, Aeronomy and Solar Phys.* (NASA-TT-F-15862) Jan. 1974 p 148-156 refs Transl. into ENGLISH from the book "Issledovaniya po Geomagnetizmu, Aeronomii i Fizike Solntsa (Voprosy Geliobiologii i Biologicheskogo Deystviya Magnitnykh Poley)" Moscow, Nauka Press, no. 17, 1971 p 136-142

CSSL 06C

The protective effect of a constant magnetic field sharply reduced spontaneous lysis of *E. coli* cells when subjected to ultraviolet radiation. A protective effect of a CMF was found in a study of tissue cultures of normally growing cells (kidney epithelium) and cancer cells (cells from a cancer of the larynx). The protective effect of a CMF is also seen in a combined exposure of tissue cultures to X-rays and CMF energy (strength of the CMF was 2000 oersteds with a gradient of 500 oersteds/cm). The data obtained are of interest to experimental oncology (development of new methods of treating malignant tumors). Author

N74-28616* Scripta Technica, Inc., Washington, D.C.
INFLUENCE OF A CONSTANT MAGNETIC FIELD ON THE FIBRINOGEN-FIBRIN SYSTEM

V. B. Matskevichene and A. T. Platonova *In its Studies in Geomagnetism, Aeronomy and Solar Phys.* (NASA-TT-F-15862) Jan. 1974 p 157-161 refs Transl. into ENGLISH from the book "Issledovaniya po Geomagnetizmu, Aeronomii i Fizike Solntsa (Voprosy Geliobiologii i Biologicheskogo Deystviya Magnitnykh Poley)" Moscow, Nauka Press, no. 17, 1971 p 143-147

CSSL 06P

The effect of a constant magnetic field with a strength of 2500 oersteds on the fibrinogen-fibrin system was studied in the organism of healthy rabbits with exposure times of 1 and 5 hours. The results obtained indicate disruptions in the stage of conversion of fibrinogen to fibrin and an increase in the amount of fibrinogen. Author

N74-28617* Scripta Technica, Inc., Washington, D.C.
CHANGES IN THE FIBRINOGEN-FIBRIN SYSTEM FOLLOWING A 20-HOUR EXPOSURE OF RABBITS TO A MAGNETIC FIELD

V. B. Matskevichene and T. M. Vitenson *In its Studies in Geomagnetism, Aeronomy and Solar Phys.* (NASA-TT-F-15862) Jan. 1974 p 163-166 Transl. into ENGLISH from the book "Issledovaniya po Geomagnetizmu, Aeronomii i Fizike Solntsa (Voprosy Geliobiologii i Biologicheskogo Deystviya Magnitnykh Poley)" Moscow, Nauka Press, no. 17, 1971 p 148-150

CSSL 06P

Prolonged exposure of animals to a constant magnetic field resulted in a sharp increase in the amount of fibrinogen. The addition of EACA to the plasma of experimental rabbits as well as protamine sulfate caused an additional increase in the amount of fibrinogen. A 20-hour exposure was accompanied by phenomena of paralysis of the pelvic limbs and death of some of the animals. Author

N74-28618* Scripta Technica, Inc., Washington, D.C.
EFFECT OF MAGNETIC BRACELETS ON THE COAGULATION AND ANTICOAGULATION SYSTEMS OF THE BLOOD OF PATIENTS WITH HYPERTENSION

V. V. Bubliss, L. V. Zabrodina, A. T. Platonova, and Ye. A. Meyerova *In its Studies in Geomagnetism, Aeronomy and Solar Phys.* (NASA-TT-F-15862) Jan. 1974 p 167-190 Transl. into ENGLISH from the book "Issledovaniya po Geomagnetizmu, Aeronomii i Fizike Solntsa (Voprosy Geliobiologii i Biologicheskogo Deystviya Magnitnykh Poley)" Moscow, Nauka press, no. 17,

1971 p 151-168
CSCL 06P

The data which have been obtained on the influence of magnetic bracelets on the coagulation and anticoagulation systems of the blood indicate that the wearing of magnetic bracelets results in a decrease in the coagulation activity of the blood and an increase in the activity of the anticoagulation system. These changes must be viewed as favorable for patients with cardiovascular pathology. Author

N74-28619* Scripta Technica, Inc., Washington, D.C.
TREATMENT OF THE EXTERNAL EPICONDYLITIS OF THE HUMERUS WITH A MAGNETIC FIELD
I. L. Degen *In its Studies in Geomagnetism, Aeronomy and Solar Phys.* (NASA-TT-F-15862) Jan. 1974 p 191-197 refs
Transl. into ENGLISH from the book "Issledovaniya po Geomagnetizmu, Aeronomii i Fizike Solntsa (Voprosy Geliobiologii i Biologicheskogo Deystviya Magnitnykh Poley)" Moscow, Nauka Press, no. 17, 1971 p 169-174

CSCL 06E

The therapeutic effect of a constant and varying magnetic field on epicondylitis of the humerus is studied on ninety patients. Good results are obtained from the treatment (recovery of 80%, considerable improvement in 14.5%). The method is recommended for clinical application. Author

N74-28620*# Kanner (Leo) Associates, Redwood City, Calif.
STUDIES ON THE DETECTION OF CLINICALLY SILENT INVOLVEMENT OF MUSCLE IN LUPUS ERYTHEMATOSUS

H. Nebe, Th. Thormann, E. Barthelmes, H. Klung, G. Weishaupt, E. Apostoloff, and N. Soennischen Washington NASA Jul. 1974 24 p refs
Transl. into ENGLISH from *Dermatol. Monatschrift* (East Ger.), v. 160, no. 3, 1974 p 201-214
(NASA-TT-F-15804) Avail: NTIS CSCL 06P

Muscle biopsies from patients with different clinical pictures of lupus erythematosus with and without clinical symptoms of myopathy were tested by light microscopic, immunofluorescent microscopic, and electron microscopic methods. Humoral muscular antibodies were detected by the antihuman globulin consumption test and the sarcolemma fluorescent antibody test. The histological methods proved to be the most reliable for determining lupus myopathy without clinical symptoms. No correlation was found between clinical and morphological lesions and the appearance of muscle antibodies in the serum of patients. Author

N74-28621# Brookhaven National Lab., Upton, N.Y.
CARBON AND THE BIOSPHERE

G. M. Woodwell and E. V. Pecan Aug. 1973 399 p refs
Presented at the 24th Brookhaven Symp. in Biol., Upton, New York, 16-18 May 1972
(Conf-720510) Avail: NTIS HC \$10.60

Separate abstracts were prepared for five of the 19 papers included. The additional papers discuss changes in the carbon budget in ecosystems. NSA

N74-28622# European Space Research Organization, Paris (France).

CHANGES IN THE DIURNAL VARIATIONS OF SIMULATED PILOR ACTIVITY AFTER TIME SHIFT DUE TO AIR TRAVEL THROUGH SEVERAL TIME ZONES

H. Rehme May 1974 81 p refs
Transl. into ENGLISH of *Die Veraenderung tageszeitlicher Schwankungen simulierter fliegerischer Taetigkeit unter dem Einfluss der Zeitverschiebung nach Flugreisen ueber mehrere Zeitzonen*, DLR-FB-73-25, DFVLR, 1973
(ESRO-TT-49; DLR-FB-73-25) Avail: NTIS HC \$7.25; DFVLR, Porz, West Ger. 24.80 DM

The 24-hour performance variation of 12 pilots measured in a flight simulator was compared with the performance variation on day 1, 3, 5 and 8 after air travel through 8 time zones from East to West (Germany - U.S.A.) and vice versa (return flight after a sojourn of 16 days in the U.S.A.). Conformity of the diurnal performance variations with the preflight values was found

on day 3 and 5 after the westward flight and on day 5 after the eastward flight. A daily phase shift of 1 to 2 hours was observed. The 24-hour performance average showed a significant decrement (of 8.5%) only on the first day after the eastward flight, but not, in contrast, after the westward flight. Author

N74-28623# European Space Research Organization, Paris (France).

HEMATOLOGICAL STUDIES AFTER RAPID DECOMPRESSION

Peter Bangen Jun. 1974 55 p refs
Transl. into ENGLISH of *Haematologische Untersuch. nach 'Kritischer' dekompression aus Ueberdruck*, DLR-FB-73-63, DFVLR, 4 Apr. 1973
(ESRO-TT-61; DLR-FB-73-63) Avail: NTIS HC \$5.75; DFVLR Porz, West Ger. 18.30 DM

The mode of behavior of several hematologic values after rapid decompression was studied. Following ascertainment of the normal physiological values, eighty miniature pigs were exposed at weekly intervals to ten rapid decompressions. The subsequent analyses of the blood of fifteen animals revealed significant changes in the field of cell morphology, albumin chemistry and coagulation physiology, most of the observed changes being statistically significant. The results are discussed and an attempt is made to identify the causal factors that may have had an influence on them. Author (ESRO)

N74-28624# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.

A MEASUREMENT OF THE ANISOTROPIC MODULATION TRANSFER FUNCTION OF THE EXTRAFOVEAL HUMAN VISUAL SYSTEM M.S. Thesis

Ronald I. Cowger Dec. 1973 423 p refs

(AD-777853; GE/BE/73A-4) Avail: NTIS CSCL 05/10

The anisotropy of the extrafoveal modulation transfer function (MTF) of the human visual system was measured at angles up to 45 degrees of eccentricity. The stimuli consisted of sine wave gratings of four different spatial frequencies which were presented at four different orientations. The results are presented as a series of plots depicting contrast sensitivity as a function of stimulus orientation and contrast sensitivity as a function of stimulus position in the visual field. The contrast sensitivity of all subjects was found to decrease more rapidly with increased stimulus eccentricity in the superior direction than in the nasal direction. The two predominant anisotropic effects that were observed are designated oblique effect and depressed orthogonal MTFs. Each type is described in detail and its occurrence analyzed. (Modified author abstract) GRA

N74-28625# School of Aerospace Medicine, Brooks AFB, Tex.
OCULAR DAMAGE THRESHOLDS FOR REPETITIVE PULSED ARGON LASER EXPOSURE Interim Report, Sep. 1972 - Sep. 1973

William D. Gibbons and David E. Egbert Feb. 1974 21 p refs
(AF Proj. 6301)

(AD-777144; SAM-TR-74-1) Avail: NTIS CSCL 06/18

The maculae of rhesus monkeys were exposed to radiation from an argon-ion laser operated at a wavelength of 514.5 nm in the TEM₀₀ mode. Damage thresholds were determined for exposure to a single 40 microsec pulse and for different pulse train lengths and repetition rates of 40 microsec wide repetitive pulses. The single pulse threshold was determined to be 2.0 micro J. Thresholds for repetition rates of 100 and 1000 Hz at a pulse train length of 0.5 sec were both found to be 1.0 micro J per pulse. Exposures made at a repetition rate of 100 Hz for pulse train durations of 0.1 and 1.0 sec yielded thresholds of 2.0 and 0.4 micro J per pulse. These data indicate that pulse train length has a greater effect on threshold than repetition rate for the range of parameters studied. Author (GRA)

N74-28626# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

THE PROBLEM OF SKIN DISEASES IN WORKERS ENGAGED IN THE MACHINING OF CHROMIUM ALLOYED STEELS

N. N. Bogomolets 25 Mar. 1974 9 p refs Transl. into ENGLISH from *Gigiena Truda i Prof. Zabolevaniya* (Moscow), v. 14, no. 2, Feb. 1970 p 54-55

(AD-776928; FTD-HT-23-1265-74) Avail: NTIS CSCL 06/10

Eczemas which develop in workers who operate lathes and grinding machines for the machining of chromium alloyed steels with the use of a cooling emulsion are occupational and are conditioned by the sensitizing action of chromium, which is also confirmed by the development in them of increased sensitivity to chromium. For the prophylaxis of skin diseases it is necessary to incorporate the automation and mechanization of the cutting processes, and also the regular replacement of the working solutions of cooling liquids which are fed to the machines. GRA

N74-28627# Washington Univ., Seattle.

ELECTROMAGNETIC POWER DEPOSITION IN MAN EXPOSED TO HIGH-FREQUENCY FIELDS AND THE ASSOCIATED THERMAL AND PHYSIOLOGIC CONSEQUENCES Interim Report, 21 Aug. 1972 - 18 Jan. 1973

Arthur W. Guy, Curtis C. Johnson, James C. Lin, Ashley F. Emergey, and Kenneth K. Kranning Dec. 1973 72 p refs

(Contract F41609-73-C-0002; AF Proj. 7757)

(AD-776821; SAM-TR-73-13) Avail: NTIS CSCL 06/17

The purpose of the work is to develop an electrodynamic equation of state for man adequate to describe power deposition in humans exposed to high-frequency (HF) electromagnetic fields. Further, the dissipation of this deposited energy by known models of thermal transfer is to be utilized to predict physiologic responses and burdens of persons so exposed. Because several thermal models are extant which have been shown to correlate with experimental observation, the authors began by adding radio frequency (RF) power as a thermal load in these equation sets (sections II and III). Electromagnetic equations of state are developed in section IV, followed by prediction of power transfer from fields in section V. The head, as a special case, is treated in section VI, and initial attempts to develop a more realistic electrodynamic model are described in section VII. GRA

N74-28628# Naval Air Development Center, Warminster, Pa. Crew Systems Dept.

THE ELECTRICAL RESPONSE OF THE EYE AT VARYING INTERVALS FOLLOWING AN ADAPTING FLASH EXPOSURE

Gloria T. Chisum 21 Feb. 1974 15 p refs

(AD-778342; NADC-74014-40) Avail: NTIS CSCL 06/6

ERG (Electroretinogram) were recorded at varying intervals following an adapting flash exposure. Both amplitude and latency variations are exhibited for short interflash intervals. The ERG following the longer interflash intervals are not significantly different from the dark adapted ERG. The relationship between the electrophysiological and psychophysical data is discussed.

Author (GRA)

N74-28629*# McDonnell-Douglas Astronautics Co., Huntington Beach, Calif. Engineering Div.

G-189A ANALYTICAL SIMULATION OF THE INTEGRATED WASTE MANAGEMENT-WATER SYSTEM USING RADIO-ISOTOPES FOR THERMAL ENERGY

J. V. Coggi, A. V. Loscuttoff, and R. S. Barker Nov. 1973 256 p refs

(Contract NAS8-28982)

(NASA CR-120251; MDC-G4901) Avail: NTIS HC \$16.00 CSCL 06I

An analytical simulation of the RITE-Integrated Waste Management and Water Recovery System using radioisotopes for thermal energy was prepared for the NASA-Manned Space Flight Center (MSFC). The RITE system is the most advanced concept water-waste management system currently under development and has undergone extended duration testing. It has the capability of disposing of nearly all spacecraft wastes including feces and trash and of recovering water from usual waste water sources: urine, condensate, wash water, etc. All of the process heat normally used in the system is produced from low penalty radioisotope heat sources. The analytical simulation was developed with the G189A computer program. The objective

of the simulation was to obtain an analytical simulation which can be used to (1) evaluate the current RITE system steady state and transient performance during normal operating conditions, and also during off normal operating conditions including failure modes; and (2) evaluate the effects of variations in component design parameters and vehicle interface parameters on system performance. Author

N74-28630*# Virginia Univ., Charlottesville. Center for the Application of Science and Engineering to Public Affairs.

EFFECT OF MOTION FREQUENCY SPECTRUM ON SUBJECTIVE COMFORT RESPONSE

Ira D. Jacobson, Michael B. Schoultz, and J. Coleman Blake Nov. 1973 35 p refs

(Grant NGR-47-005-181)

(Rept-403212; NASA-CR-138883) Avail: NTIS HC \$4.75 CSCL 05E

In order to model passenger reaction to present and future aircraft environments, it is necessary to obtain data in several ways. First, of course, is the gathering of environmental and passenger reaction data on commercial aircraft flights. In addition, detailed analyses of particular aspects of human reaction to the environment are best studied in a controllable experimental situation. Thus the use of simulators, both flight and ground based, is suggested. It is shown that there is a reasonably high probability that the low frequency end of the spectrum will not be necessary for simulation purposes. That is, the fidelity of any simulation which omits the very low frequency content will not yield results which differ significantly from the real environment. In addition, there does not appear to be significant differences between the responses obtained in the airborne simulator environment versus those obtained on commercial flights.

Author

N74-28631*# Boeing Aerospace Co., Seattle, Wash. Research and Engineering Div.

LABORATORY DEMONSTRATION MODEL: ACTIVE CLEANING TECHNIQUE DEVICE Final Report

R. L. Shannon and R. B. Gillette Mar. 1974 60 p refs

(Contract NAS8-28270)

(NASA-CR-120292; D180-18031-1) Avail: NTIS HC \$6.00 CSCL 06I

The technique which utilizes exposure to a plasma to remove contaminants from a surface was incorporated into a laboratory model which demonstrates active cleaning by both plasma cleaning and ion sputtering modes of operation. The development phase is reported and includes discussion of the plasma tube configuration, device design, and performance tests. A general description of the active cleaning device is provided which includes information on the main power/plasma discharge sensors, and the power, gas supply, and ion accelerator systems. Development of the active cleaning species at high vacuum conditions is described and results indicate that plasma cleaning occurs in the region of a visible plume which extends from the end of the plasma tube. Recommendations are made for research to determine the plasma cleaning mechanism and the plasma species responsible for the cleaning, as well limitations on the type of contaminants that can be removed. A.A.D.

N74-28632*# General American Transportation Corp., Niles, Ill. Engineering Research Div.

VACUUM DISTILLATION/VAPOR FILTRATION WATER RECOVERY Summary Report for Phase 3

R. J. Honegger, R. B. Neveril, and G. A. Remus Apr. 1974 40 p

(Contract NAS8-27467; GARD Proj. 1528)

(NASA-CR-120303) Avail: NTIS HC \$5.00 CSCL 06K

The development and evaluation of a vacuum distillation/vapor filtration (VD/VF) water recovery system are considered. As a functional model, the system converts urine and condensate waste water from six men to potable water on a steady-state basis. The system is designed for 180-day operating durations and for function on the ground, on zero-g aircraft, and in orbit. Preparatory tasks are summarized for conducting low gravity tests of a vacuum distillation/vapor filtration system for recovering water from urine. Author

N74-28633*# Mentor Co., Sacramento, Calif.
SOME NASA CONTRIBUTIONS TO HUMAN FACTORS ENGINEERING: A SURVEY

R. A. Behan and H. W. Wendhausen Washington NASA 1973
 109 p refs Prepared in cooperation with computer Sci. Corp.,
 Falls Church, Va.
 (Contract NASw-2173)
 (NASA-SP-5117) Avail: NTIS MF \$1.45, SOD HC \$1.15 CSDL
 OSE

This survey presents the NASA contributions to the state of the art of human factors engineering, and indicates that these contributions have a variety of applications to nonaerospace activities. Emphasis is placed on contributions relative to man's sensory, motor, decisionmaking, and cognitive behavior and on applications that advance human factors technology. Author

N74-28634# Deutsche Gesellschaft fuer Luft- und Raumfahrt, Cologne (West Germany).

TECHNIQUES FOR MAN-MACHINE-INVESTIGATIONS

1974 125 p refs In GERMAN; ENGLISH summary Proc. of the 13th DGLR Human Factor Eng. Comm. Meeting, Brunswick, 14 Jun. 1973
 (DLR-Mitt-74-03) Avail: NTIS \$9.25; ZLDI, Munich 25.90 DM

The statistical planning of human factor engineering experiments is discussed, for ceteris-paribus, factor, and optimization experiments. A dynamic test method for investigating electronic CRT displays is presented, and readability aspects are highlighted. The design and performance of anthropotechnical experiments is exemplified by a flight simulator experiment. A simulation method is described for the investigation and improvement of interaction at the man machine interface using a digital computer.

N74-28635 Technische Hochschule, Darmstadt (West Germany). Inst. fuer Arbeitswissenschaft.

STATISTICAL PLANNING OF ERGONOMIC EXPERIMENTS. POSSIBILITIES AND USEFULNESS [STATISTISCHE PLANUNG ERGONOMISCHER EXPERIMENTE - MOEGlichkeiten UND NUTZEN]

Holger Luczak /n DGLR tech. for Man-Machine-Invest. 1974 p 7-23 refs In GERMAN; ENGLISH summary

Three types of ergonomic experiments are distinguished according to the number of independent variables. Objectives and content of experimental design are explained. For the design of ceteris-paribus-experiments, the maximization of homogeneity of experimental conditions, the control and elimination of the experimental error by randomized blocks, Latin and Greek-Latin squares, and the minimization of the number of experiments by sequential analysis are proposed. Deterministic and stochastic methods for optimum conditions determination of several experimental parameters, with respect to a response function, are mentioned. Author (ESRO)

N74-28636 Forschungsinstitut fuer Anthropotechnik, Meckenheim (West Germany).

A DYNAMIC TEST METHOD FOR INVESTIGATIONS OF ELECTRONIC DISPLAYS [EINE DYNAMISCHE VERSUCHSMETHODE FUER UNTERSUCHUNGEN AN ELEKTRONISCHEN ANZEIGEN]

Ernst Schubert /n DGLR Tech. for Man-Machine-Invest. 1974 p 24-35 refs In GERMAN; ENGLISH summary

Using experimental results, a technique is described which enables the determination of a readability index for electronically generated displays (digital/analog scales). The experimental method entails presenting subjects with various combinations of numerics, lines, and/or pointers displayed on a CRT. The speed at which displayed numerical values change is continuously variable and under the control of the experimenter. Immediately

following a random-length trial run, the display is turned off, and the subject has to verbally report the last recognized meter value. The reading accuracy on six different scale forms was investigated as a function of changing value speed and movement tendency. The experimental results showed that the technique employed is uniquely suitable for quantitatively determining the readability of continuously changing value displays, such as speedometer or altimeters. Author (ESRO)

N74-28637 Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Brunswick (West Germany). Inst. fuer Flugfuehrung.

LAYOUT AND PERFORMANCE OF ANTHROPOTECHNICAL EXPERIMENTS, EXEMPLIFIED BY A FLIGHT SIMULATOR INVESTIGATION [AUSLEGUNG UND DURCHFUEHRUNG ANTHROPOTECHNISCHER EXPERIMENTE. DEMONSTRIERT AM BEISPIEL EINER UNTERSUCHUNG IM FLUGSIMULATOR]

Josef Thomas and Ernst Kohnen /n DGLR Tech. for Man-Machine-Invest. 1974 p 36-63 refs In GERMAN; ENGLISH summary

A reliable assessment of man machine systems is dependent on the coordination of some different aspects in the layout of anthropotechnical experiments. A schedule is introduced for the development of a systematic approach to a clean methodology in planning and running investigations. The basic ideas and testing procedures are illustrated by some examples of practical experiments, such as in a flight simulator. Author (ESRO)

N74-28638 Forschungsinstitut fuer Anthropotechnik, Meckenheim (West Germany).

A SIMULATION METHOD FOR THE INVESTIGATION AND IMPROVEMENT OF INTERACTION AT THE MAN-MACHINE INTERFACE USING A DIGITAL COMPUTER [EINE SIMULATIONSMETHODE ZUR UNTERSUCHUNG UND VERBESSERUNG DER WECHSELWIRKUNGEN AN DER SCHNITTSTELLE MENSCH-MASCHINE MIT HILFE EINES DIGITALRECHNERS]

Bernhard Doering /n DGLR Tech. for Man-Machine-Invest. 1974 p 64-85 refs In GERMAN; ENGLISH summary

Method is presented which serves as a useful tool for simulation of system processes in man machine systems with special emphasis on the interactions at the man machine interface. A dynamic functional model of the man machine system and its intended mission environment was simulated on a digital computer. The simulation model includes operator functions, such as information selection, decision making etc., and a selection of relevant system and environmental processes. Through analysis of data generated by the computer, useful information concerning system mission operating characteristics and their effectiveness can be obtained. System design and operating procedural changes can be evaluated with the model. Author (ESRO)

N74-28639 Technische Universitaet, Brunswick (West Germany). Sonderforschungsbereich Flugfuehrung.

METHOD FOR MEASURING EYE MOVEMENTS OF PILOTS, EXEMPLIFIED FOR ILS APPROACHES [ZUR METHODIK DER MESSUNG VON BLICKBEWEGUNGEN AN PILOTEN, DEMONSTRIERT AM BEISPIEL DES ILS-ANFLUGES]

Wolfgang Heinze and Hans Radke (DFVLR, Brunswick) /n DGLR Tech. for Man-Machine-Invest. 1974 p 86-96 refs In GERMAN; ENGLISH summary

A method for the measurement and evaluation of pilot's eye movement is reported. The measurements were taken with an optical eye movement recorder during three ILS-approaches. The parameters of scanning frequency and scanning time for the seven most important flight instruments are discussed. Author (ESRO)

N74-28640 Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (West Germany).

RESULTS OF TELEMETRIC STRESS MEASUREMENTS OF

PULSE AND RESPIRATORY FREQUENCY ON THE VJ 101 C - X 2, AND A PROPOSAL FOR THE USE OF A STANDARDIZED EVALUATION PROGRAM FOR THE FUTURE TREATMENT OF SUCH INVESTIGATIONS [ERGENISSE TELEMETRISCHER BELASTUNGSMESSUNGEN VON PULS- UND ATEMFREQUENZ AN DER VJ 101 C - X 2 SOWIE EIN VORSCHLAG FUER DEN EINSATZ EINES STANDARDISIERTEN AUSWERTEPROGRAMMES FUER DIE KUENFTIGE BEARBEITUNG DERARTIGER UNTERSUCHUNGEN]
 F. Koehl /in DGLR Tech. for Man-Machine-Invest. 1974 p 97-115 In GERMAN: ENGLISH summary

Work in measuring, data processing, and evaluating biological parameters, such as pulse and respiratory rate, during flight tests is discussed. Experimental equipment is described, as well as EDP programs for evaluating results. Measurement standardization and EDP are aimed at cost reduction. Statistical analysis of pilot work and flight conditions is also presented. ESRO

N74-28641# Anacapa Sciences, Inc., Santa Barbara, Calif.
CREW SYSTEM DESIGN
 Kenneth D. Cross and James J. McGrath Jul. 1973 374 p refs Presented at Proc. of an Interagency Conf., Los Angeles, 12-14 Sep. 1972
 (Contract N00014-72-C-0105)
 (AD-777996) Avail: NTIS CSCL 05/5

The purpose of the conference was to promote the timely use of the best available technology in the development and evaluation of aerospace crew systems. GRA

N74-28642# Air Force Human Resources Lab., Brooks AFB, Tex.

VALIDATION OF TWO AIRCREW PSYCHOMOTOR TESTS Final Technical Report
 David F. McGrevy and Lonnie D. Valentine, Jr. Jan. 1974 21 p refs
 (AF Proj. 7719)
 (AD-777830; AFHRL-TR-74-4) Avail: NTIS CSCL 05/9

The study documents the initial validation of two psychomotor tests developed by the Air Force Human Resources Laboratory. The tests, known as Two-Hand Coordination and Complex Coordination do not closely resemble the old. These tests were validated on a sample of 121 student officers scheduled for pilot training. Criteria were graduation from pilot training and attrition by reason of flying deficiency. Multiple regression analyses supported the conclusion that the two psychomotor tests together make a significant contribution to prediction of graduation in the context of the Air Force Officer Qualifying Test. Correlation data suggested that Complex Coordination is the more effective of the psychomotor tests when taken singly. (Modified author abstract) GRA

N74-28643# Illinois Univ., Savoy. Aviation Research Lab.
APPLICATION OF MODERN CONTROL THEORY TO THE DESIGN OF MAN-MACHINE SYSTEMS Ph.D. Thesis
 Fuat Ince Aug. 1973 83 p refs
 (Contract F44620-70-C-0105; AF Proj. 9778; AF Proj. 6813)
 (AD-777163; ARL-73-17/AFOSR-73-11; AFOSR-73-2323TR)
 Avail: NTIS CSCL 05/8

The optimal control model of the human operator is reviewed. A new expression derived for the covariance matrix of the system states shows that a human-controlled plant is equivalent to an optimally controlled plant with added outside disturbance arising from the physiological limitations on man. Based on the characteristics of man, principles are proposed for the design of the two aspects on the man-machine interface, that is, the control dynamics and the display dynamics. Results from modern control theory are presented for the implementation of these principles. Model predicted performance improvement in the flight control of a light twin-engine aircraft simulator is compared with data from two experiments. The experimental data support the proposed design principles, in one case, even to a greater extent than the model predictions. Author (GRA)

N74-28644# Dunlap and Associates, Inc., Inglewood, Calif.
TRANSFER OF TRAINING FROM PREDICTOR TO CONVENTIONAL DISPLAYS Interim Report, 1 Oct. 1972 - 31 Aug. 1973

J. W. Wulfbeck 31 Oct. 1973 23 p refs
 (Contract F44620-73-C-0014; AF Proj. 9778; AF Proj. 6813)
 (AD-777171; AFOSR-73-2330TR) Avail: NTIS CSCL 05/9

Use of a predictor display has been shown to virtually transform the difficulty of a variety of complex, manual control pursuit tracking tasks to the level of those having relatively simple control requirements. Within 15 minutes practice, naive operators are able to perform some complex tasks with a predictor display at accuracy levels previously achievable only after extensive training without a predictor display. The purpose of the present program is to explore adaptive use of a predictor display to promote rapid and accurate learning on conventional tracking tasks. GRA

N74-28645# National Academy of Sciences - National Research Council, Washington, D.C. Committee on Hearing Biocoustics Biomechanics.

GUIDELINES FOR A TRAINING COURSE IN NOISE SURVEY TECHNIQUES
 John Shadley, William Gately, George W. Kamperman, and Paul L. Michael Jan. 1974 22 p
 (Contract N00014-67-A-0244-0021)
 (AD-776631) Avail: NTIS CSCL 05/9

The course is designed to train noise survey technicians during a 3-5 day period to make reliable measurements of 75% of the noise problems encountered in the community. The more complex noise problems remaining will continue to be handled by experienced specialists. These technicians will be trained to assist state and local governments in enforcement of their noise ordinances and in investigations of noise complaints. Author (GRA)

N74-28646# School of Aerospace Medicine, Brooks AFB, Tex.
EVALUATION OF INTRATRACHEAL CUFFS FOR AEROMEDICAL EVACUATION Final Report, Sep. - Dec. 1973
 David L. Stoner and Julian P. Cooke Dec. 1973 14 p refs
 (AF Proj. 7996)
 (AD-776319; SAM-TR-73-50) Avail: NTIS CSCL 06/12

Conventional, low-residual-volume intratracheal cuffs exert possible trachea damaging pressures at ground level and definitely damaging pressures upon ascent to 8,000 ft. Also, these cuffs exert excessively high pressures with decompression to 35,000 ft. Cuff/tracheal pressure exerted by a foam-type cuff was relatively unaffected by altitude changes, but depended on critical selection of the proper size tube. In contrast, several types of low-pressure, large-residual-volume cuffs with a control balloon maintained a satisfactory cuff/tracheal pressure at all altitudes. Author (GRA)

N74-28647# Air Force Human Resources Lab., Brooks AFB, Tex.
TRANSFER FROM AUDIOVISUAL PRETRAINING TO A CONTINUOUS PERCEPTUAL MOTOR TASK Final Report, Jun. 1972 - Aug. 1973
 Milton E. Wood and Vernon S. Gerlach Mar. 1974 35 p refs
 (AF Proj. 1138)
 (AD-778078; AFHRL-TR-74-8) Avail: NTIS CSCL 05/9

A technique was developed for providing transfer-of-training from a form of audiovisual pretraining to an instrument flight task. The continuous flight task was broken into discrete categories of flight. Each category combined an instrument configuration with a return-to-criterion aircraft control response. Three methods of sequencing categories during pretraining were compared: One group was pretrained by presenting categories in a natural task sequence, a second group was pretrained on categories presented in random order while a baseline group received no category pretraining. Significant positive transfer was found for both the sequenced and random forms of pretraining relative to the baseline group. Transfer percentages ranged from seven to 48% throughout transfer practice. Author (GRA)

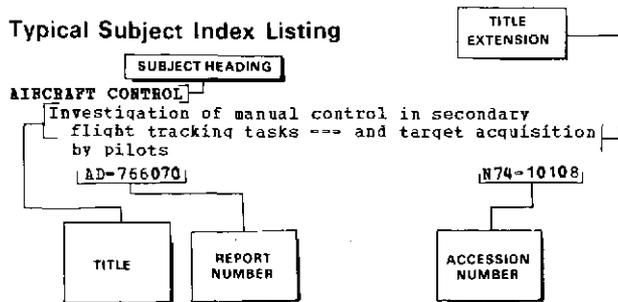
N74-28648# Cincinnati Univ., Ohio.
**USER'S MANUAL FOR UCIN VEHICLE-OCCUPANT
CRASH-STUDY MODEL** Technical Report, 15 Mar. - 1 May
1974
Chris E. Passerello and Ronald L. Huston 1 May 1974 31 p
ref
(Contract N00014-72-A-0027-0002)
(AD-778338: UC-EA-050174-2-ONR) Avail: NTIS CSCL
13/6

The report is a user's manual for the vehicle-occupant, crash-study, computer program model. The manual briefly describes the model and the range of applicability of the program. It provides detailed instructions regarding the card coding of input data. It discusses the interpretation of the output results. A sample listing of input data is also provided. Author (GRA)

Subject Index

AEROSPACE MEDICINE AND BIOLOGY / *A Continuing Bibliography (Suppl. 133)* OCTOBER 1974

Typical Subject Index Listing



The title is used to provide a description of the subject matter. When the title is insufficiently descriptive of the document content, a title extension is added, separated from the title by three hyphens. The NASA or AIAA accession number is included in each entry to assist the user in locating the abstract in the abstract section of this supplement. If applicable, a report number is also included as an aid in identifying the document.

A

- ABIOTHESESIS**
Thermodynamics and the origin of life --- emphasizing free energy
A74-37437
- ACCELERATION (PHYSICS)**
The effects of sustained acceleration, airframe buffet, and aircraft flying qualities on tracking performance
[AIAA PAPER 74-793] A74-37813
- ACCELERATION STRESSES (PHYSIOLOGY)**
Impedance measurements for the development of a nonlinear model of supine man
A74-36685
- Human tolerance to shock - Evaluation criteria and limiting values
A74-36688
- Physiologic responses to high sustained plusGz acceleration --- pressure suit for increased human tolerance
[AD-777604] N74-27559
- Space biology and aerospace medicine, volume 8, no. 3, 1974
[JPBS-62553] N74-28567
- Peculiarities of the nystagmic reaction in human subjects after exposure to linear acceleration
N74-28583
- Effects of vitamins on the penetration of lipote-S sup 35 into the cells of animals subjected to acceleration
N74-28589
- ACCELERATION TOLERANCE**
Prediction of acceleration tolerance by means of a decompression functioning test
A74-37532
- Physiologic responses to high sustained plusGz acceleration --- pressure suit for increased human tolerance
[AD-777604] N74-27559
- State of the neurosecretory nuclei of the hypothalamus after combined exposure to acceleration and ionizing radiation
N74-28571
- ACCIDENT PREVENTION**
Lythgoe's visual stereophenomenon in the natural environment - A possible factor in air and highway accidents
A74-36753
- ACHIEVEMENT**
Achievement motivation in pilots-selection
A74-37005
- ACID BASE EQUILIBRIUM**
A micromixing method for determination of oxygen equilibria in blood
A74-36222
- ACOUSTIC FATIGUE**
Data on the acoustic comfort of passengers in railroad cars and soundproofing recommendations
N74-28398
- ACOUSTIC MEASUREMENTS**
Guidelines for a training course in noise survey techniques
[AD-776631] N74-28645
- ACTIVATION (BIOLOGY)**
Influence of functional loads on the state of the phagocytic function of blood in dogs subjected to chronic gamma-irradiation --- physiological defense mechanisms to irradiation
N74-28592
- Studies in Geomagnetism, aeronomy and solar physics (problems of heliobiology and the biological effect of magnetic fields)
[NASA-TT-F-15862] N74-28596
- Influence of synoptic processes on fibrinolysis and fibrinogenolysis in healthy persons --- meteorological effects on blood coagulation
N74-28601
- The influence of weather on fibrinolysis and fibrinogenolysis --- in human body
N74-28602
- Change in blood coagulation indices as a function of the incubation period of plasma in a constant magnetic field --- considering heparin tolerance and recalcification
N74-28610
- Change in fibrinolytic activity under the influence of a constant magnetic field --- blood coagulation normalization in heart patients
N74-28611
- Influence of a constant and variable magnetic field on the coagulation of human blood in vitro and in vivo
N74-28612
- Method of magnetobiological indication in clinical laboratory practice --- considering immunobiological activation
N74-28613
- Influence of a constant magnetic field on thrombocytes --- delay of blood coagulation time
N74-28614
- The protective effect of a constant magnetic field --- reduction of molecular cell pathology
N74-28615
- Influence of a constant magnetic field on the fibrinogen-fibrin system --- in blood coagulation process
N74-28616
- ACTIVITY CYCLES (BIOLOGY)**
Glossary of selected chronobiologic terms
A74-36229
- Reactions of spinal cord interneurons of delabyrinthectomized cats during oscillation
N74-28593
- ADAPTATION**
The influence of a constant magnetic field on the coagulatory system of the blood in an experiment
N74-28608
- ADRENAL METABOLISM**
Effect of imipramine, nitrazepam and sodium hydroxybutyrate on sleep impairments caused by emotional stress
N74-28575
- ADRENOCORTICOTROPIN (ACTH)**
Effect of heat on growth hormone secretion and adrenal cortex activity in rats
A74-36363

AEROSPACE MEDICINE

- Normal serum calcium levels in Air Force flying personnel
A74-36473
- The dangerous sky: A history of aviation medicine --- Book
A74-36775
- Research in aviation psychology; European Congress on Aviation Psychology, 10th, Paris, France, September 11-15, 1973, Transactions
A74-36995
- Development of an electronic nebulized-humidifier [AD-778082]
N74-27564
- Joint Army Navy air crew impact injury prevention program [AD-777713]
N74-27582
- Space biology and aerospace medicine, volume 8, no. 3, 1974 [JPRS-62553]
N74-28567
- Evaluation of intratracheal cuffs for aeromedical evacuation [AD-776319]
N74-28646
- AEROSPACE SYSTEMS**
Crew system design [AD-777996]
N74-28641
- AFFERENT NERVOUS SYSTEMS**
Effect of cutting off the septal afferentia on acetylcholinesterase activity in the short-axon neurons of the hippocampus
A74-36936
- AFTERBURNING**
Development of integrated, zero-g pneumatic transporter/rotating paddle incinerator/catalytic afterburner subsystem for processing human wastes on board spacecraft [NASA-CR-114763]
N74-27575
- AFTERIMAGES**
Form-specific colour after effects in scotopic illumination
A74-37047
- AIR**
Air bag restraint systems --- for motor vehicle operators [PB-227749/9]
N74-27584
- AIR POLLUTION**
A study of the biological effect of continuous inhalation exposure of 1, 1, 1-trichloroethane (methyl chloroform) on animals [NASA-CR-134323]
N74-27550
- Studies on room ozonizers and on ozone occurrence in the outside air and in industrial plants [APTIC-07834]
N74-27551
- Diseases due to pollutions [APTIC-41124]
N74-27552
- The chronic effects of nitrogen dioxide --- on respiratory systems of mice [APTIC-40168]
N74-27553
- Concerning the effects of air pollution on the human organism in the Yokkaichi region [APTIC-47896]
N74-27554
- Hepatic pathology in mice after continuous inhalation exposure to 1, 1, 1-trichloroethane [NASA-CR-134322]
N74-27556
- AIR TRAFFIC CONTROL**
Clinical problems and stress in air traffic control
A74-35700
- Stress and the air traffic controller
A74-37010
- AIR TRANSPORTATION**
Man as a precious resource - The enhancement of human effectiveness in air transport operations
A74-36323
- AIRBORNE EQUIPMENT**
Experimental evaluation of an airborne illumination system
A74-36754
- AIRCRAFT ACCIDENTS**
Pilot factor in aircraft accidents of the German Federal Armed Forces
A74-37004
- The role of man in system safety
A74-37006
- AIRCRAFT COMPARTMENTS**
Ozone in aircraft cabins
A74-36465
- AIRCRAFT DESIGN**
Effect of the psychophysiological properties of a pilot on the choice of the dynamic characteristics of an aircraft
A74-36506
- AIRCRAFT INSTRUMENTS**
Consideration of investigation on reading error of aircraft instruments
A74-36653
- AIRCRAFT LIGHTS**
Experimental evaluation of an airborne illumination system
A74-36754
- AIRCRAFT PERFORMANCE**
The effects of sustained acceleration, airframe buffet, and aircraft flying qualities on tracking performance [AIAA PAPER 74-793]
A74-37813
- AIRCRAFT PILOTS**
Hearing threshold sensitivity in airline pilots
A74-36478
- Visual and manual workload of the helicopter pilot [AHS PREPRINT 821]
A74-36625
- Method for measuring eye movements of pilots, exemplified for ILS approaches
N74-28639
- AIRFRAMES**
The effects of sustained acceleration, airframe buffet, and aircraft flying qualities on tracking performance [AIAA PAPER 74-793]
A74-37813
- AIRSPEED**
Effects of aircraft altitude and speed on air-to-ground visual target acquisition
A74-36474
- ALLERGIC DISEASES**
The problem of skin diseases in workers engaged in the machining of chromium alloyed steels [AD-776928]
N74-28626
- ALTITUDE ACCLIMATIZATION**
Evidence of altered regulation of ventilation during exposure to hypoxia
A74-37742
- ALTITUDE SIMULATION**
Effects of hypoxia on peripheral visual response to rapid sustained stimulation
A74-36217
- Effect of carbon monoxide on cardiac weight as compared with altitude effects
A74-36218
- Blood sugar levels in rats exposed to varying altitude stress for different periods of time
A74-36470
- AMBIENT TEMPERATURE**
Effect of heat on growth hormone secretion and adrenal cortex activity in rats
A74-36363
- AMINO ACIDS**
Investigation of assimilability of amino acids by man receiving an amino acid mixture --- replacement of protein component in diet
N74-28586
- Discovery of amino acids in regions of present-day volcanic activity
N74-28590
- AMPLIFICATION**
The optimization of control gain by self-adjustment
A74-36658
- ANEMIAS**
Repeated action of a constant magnetic field on the blood coagulation system in artificially produced anemia
N74-28609
- ANGIOGRAPHY**
Detection of hypokinesis by a quantitative analysis of left ventricular cineangiograms
A74-36979
- ANGLE OF ATTACK**
Kinematic characteristics of motion of the human head in different planes
N74-28587
- ANGLES (GEOMETRY)**
Evidence for the inhibition hypothesis in expanded angle illusion
A74-37046

- ANIMALS**
A study of the biological effect of continuous inhalation exposure of 1, 1, 1-trichloroethene (methyl chloroform) on animals [NASA-CR-134323] N74-27550
- ANTHROPOMETRY**
Layout and performance of anthropotechnical experiments, exemplified by a flight simulator investigation N74-28637
User's manual for DCIN vehicle-occupant crash-study model [AD-778338] N74-28648
- ANTIBODIES**
Characteristics of the immunological state of man during hypoxic hypoxia N74-28582
- ANTIRADIATION DRUGS**
Effectiveness of administration of amytravite and ATP during prolonged irradiation --- effectiveness of prophylactic antiradiation drugs N74-28570
- ANXIETY**
Adjustment and maladjustment in elementary pilot training A74-36998
- APPROACH CONTROL**
Method for measuring eye movements of pilots, exemplified for ILS approaches N74-28639
- ARGON LASERS**
Ocular damage thresholds for repetitive pulsed argon laser exposure [AD-777144] N74-28625
- ARMED FORCES**
Soft (hydrophilic) contact lenses in US Army aviation: An investigative study of the Bausch and Lomb Soflens [AD-776353] N74-27580
- ARTERIES**
Arterial pulse wave pressure transducer [NASA-CASE-GSC-11531-1] N74-27566
- ARTHRITIS**
Treatment of the external epicondylitis of the humerus with a magnetic field N74-28619
- ASPERGILLUS**
Long term effect on high vacuum on microorganisms [NASA-TT-F-15720] N74-28564
- ASTRONAUT PERFORMANCE**
All-exotic materials used in NASA's Skylab/Space Shuttle crews' bump protective helmets A74-35839
- ATHLETES**
Cardiopulmonary function in prospective competitive swimmers and their parents A74-36210
- ATMOSPHERIC COMPOSITION**
Atmospheric homeostasis by and for the biosphere - The Gaia hypothesis A74-35521
Oxygen consumption by rats during prolonged breathing of an atmosphere with an increased carbon dioxide content N74-28591
- ATMOSPHERIC TURBULENCE**
Experimental investigation of the influence of loads of variable sign on pilot efficiency and passenger comfort A74-36564
- ATOMIZERS**
Development of an electronic nebulized-humidifier [AD-778082] N74-27564
- ATTACK AIRCRAFT**
Effect of nap-of-the-earth requirements on aircrew performance during night attack helicopter operations [AHS PREPRINT 863] A74-36603
- AUDITORY DEFECTS**
Hearing threshold sensitivity in airline pilots A74-36478
Level, peculiarities and effects of coal mine noise on pit workers --- correlation between noise intensity and hearing impairment N74-28390
- AUDITORY PERCEPTION**
Transfer from audiovisual pretraining to a continuous perceptual motor task [AD-778078] N74-28647
- AUDITORY SENSATION AREAS**
On functions and structure of deep layers of immature auditory cortex A74-36362
- AUDITORY STIMULI**
On functions and structure of deep layers of immature auditory cortex A74-36362
Vertex evoked potentials in a rating-scale detection task: Relation to signal probability [NASA-CR-138796] N74-27573
- AUTOMATIC CONTROL**
The development of an experimental human-operator sensory system A74-37011
- AUTOMOBILES**
Effects of sonic boom on automobile-driver behaviour [UTIAS-TW-188] N74-27576
Air bag restraint systems --- for motor vehicle operators [PB-227749/9] N74-27584

B

- BACILLUS**
Long term effect on high vacuum on microorganisms [NASA-TT-F-15720] N74-28564
- BACTERIA**
Microbial detection method based on sensing molecular hydrogen A74-36374
Oxygen effects on mortality of mice infected with Diplococcus pneumoniae A74-36471
Aeromonas proteolytica bacteria in aerospace environments --- possible genetic alterations and effects on man [NASA-CR-134328] N74-28560
- BED REST**
Influence of bedrest and hypercapnia upon urinary mineral excretion in man A74-36475
- BIBLIOGRAPHIES**
Scientific publications and presentations relating to planetary quarantine. Volume 5: The 1973 supplement --- bibliography [NASA-CR-138898] N74-28554
- BINOCULAR VISION**
Lythgoe's visual stereophenomenon in the natural environment - A possible factor in air and highway accidents A74-36753
Human binocular summation at absolute threshold A74-37907
- BIOCONTROL SYSTEMS**
Mathematical methods in the study of biological regulatory systems --- Russian book A74-36130
Uncertainty sets associated with saccadic eye movements - Basis of satisfaction control A74-37908
- BIODYNAMICS**
Kinematic characteristics of motion of the human head in different planes N74-28587
- BIOELECTRIC POTENTIAL**
Cortical and intracortical study of parietal and temporal evoked visual potentials in photosensitive baboons A74-36359
On functions and structure of deep layers of immature auditory cortex A74-36362
An evaluation of several cardiac activation models A74-36905
Some observations on the homogeneity of response of single chemoreceptor fibres --- in cat carotid sinus nerve A74-37740
Reactions of spinal cord interneurons of labyrinthectomized cats during oscillation N74-28593
- BIOELECTRICITY**
Phrenic motoneuron activity during thermal or hypocapnic polyphnea A74-36364

BIOENGINEERING

SUBJECT INDEX

BIOENGINEERING

- Biomedical engineering tasks --- electrode development for electrocardiography and electroencephalography
[NASA-CR-128733] N74-27570
- Evaluation of intratracheal cuffs for aeromedical evacuation
[AD-776319] N74-28646

BIOGEOCHEMISTRY

- Atmospheric homeostasis by and for the biosphere - The Gaia hypothesis
A74-35521

BIOINSTRUMENTATION

- A micromixing method for determination of oxygen equilibria in blood
A74-36222
- A servo-force balance isometric muscle force transducer
A74-36224

BIOLOGICAL EFFECTS

- A review of selected bioeffects thresholds for various spectral ranges of light
[PB-228391/9] N74-27563
- Heliobiology, its development, successes and tasks --- solar activity effects on life on earth
N74-28597
- Results of comparison of the dynamics of the epidemic process with changes in the planetary index of magnetic disturbance --- statistical correlation to solar activities
N74-28603

BIOMEDICAL DATA

- A method for evaluating computer programs for electrocardiographic interpretation. I - Application to the experimental IBM program of 1971
A74-36976
- A method for evaluating computer programs for electrocardiographic interpretation. II - Application to version D of the PHS program and the Mayo Clinic program of 1968
A74-36977
- The development of an experimental human-operator sensory system
A74-37011

BIOMETRICS

- A servo-force balance isometric muscle force transducer
A74-36224
- Detection of the K-complex in human EEG sleep records
[AD-777243] N74-27560
- Arterial pulse wave pressure transducer
[NASA-CASE-GSC-11531-1] N74-27566

BIONICS

- Mathematical methods in the study of biological regulatory systems --- Russian book
A74-36130
- Impedance measurements for the development of a nonlinear model of supine man
A74-36685
- Renal parameter estimates in unrestrained dogs
A74-37911

BIOSYNTHESIS

- Fine structure of tannin accumulations in callus cultures of Pinus elliotti /slash pine/
A74-36195

BIOTECHNOLOGY

- Transphoresis and isotachophoresis as preparative techniques with reference to zero-gravity
[AIAA PAPER 74-664] A74-35911

BLOOD

- A micromixing method for determination of oxygen equilibria in blood
A74-36222
- Blood sugar levels in rats exposed to varying altitude stress for different periods of time
A74-36470
- A theoretical analysis of the relationship between venous blood and mean tissue oxygen pressures
A74-37741

BLOOD CIRCULATION

- Regional vascular changes after functional loading
A74-35525
- Reaction of the resistive and capacitive vessels of the hand at the start of muscular exercise
A74-36360

Study of the possibility of use of decompression of the lower body in diagnosis of body predisposition to a syncopal state --- for pilot selection
N74-28581

BLOOD COAGULATION

- Thermal tolerance of blood serum in dogs subjected to combined exposure to X-radiation and reduced barometric pressure
N74-28594
- Notes on the concept of normal values employed in clinical practice --- statistical correlation with environment effects
N74-28598
- Influence of solar activity on fibrinolysis and fibrinogenolysis --- statistical correlation between solar flare and blood coagulation indices
N74-28599
- Fibrinolysis and fibrinogenolysis on magnetically-active days --- statistical correlation to magnetic storms
N74-28600
- Influence of synoptic processes on fibrinolysis and fibrinogenolysis in healthy persons --- meteorological effects on blood coagulation
N74-28601
- The influence of weather on fibrinolysis and fibrinogenolysis --- in human body
N74-28602
- Effect of a magnetic field of extremely low intensity on the coagulatory system of the blood
N74-28607
- The influence of a constant magnetic field on the coagulatory system of the blood in an experiment
N74-28608
- Repeated action of a constant magnetic field on the blood coagulation system in artificially produced anemia
N74-28609
- Change in blood coagulation indices as a function of the incubation period of plasma in a constant magnetic field --- considering heparin tolerance and recalcification
N74-28610
- Change in fibrinolytic activity under the influence of a constant magnetic field --- blood coagulation normilization in heart patients
N74-28611
- Influence of a constant and variable magnetic field on the coagulation of human blood in vitro and in vivo
N74-28612
- Influence of a constant magnetic field on thrombocytes --- delay of blood coagulation time
N74-28614
- Influence of a constant magnetic field on the fibrinogen-fibrin system --- in blood coagulation process
N74-28616
- Changes in the fibrinogen-fibrin system following a 20-hour exposure of rabbits to a magnetic field
N74-28617
- Effect of magnetic bracelets on the coagulation and anticoagulation systems of the blood of patients with hypertension
N74-28618

BLOOD FLOW

- A television method for measuring capillary red cell velocities
A74-36223
- A comparison of regional blood flow and oxygen utilization during dynamic forearm exercise in normal subjects and patients with congestive heart failure
A74-36980
- Ultrasonic Doppler measurement of renal artery blood flow
[NASA-CR-138902] N74-28595

BLOOD PLASMA

- Plasma volume changes during acute exposure to a high environmental temperature
A74-36212
- Heart rate and energy-yielding substrates in blood during long-lasting running
A74-36398
- Normal serum calcium levels in Air Force flying personnel
A74-36473

- Changes in the plasma electrolyte levels of the rabbits during acute exposure to simulated high altitude
A74-36652
- Effects of acute exposure to hypobaric hypoxia on water contents in the blood and several tissues in the rat
A74-36654
- Change in blood coagulation indices as a function of the incubation period of plasma in a constant magnetic field --- considering heparin tolerance and recalcification
N74-28610
- Change in fibrinolytic activity under the influence of a constant magnetic field --- blood coagulation normalization in heart patients
N74-28611
- BLOOD PRESSURE**
Renal parameter estimates in unrestrained dogs
A74-37911
- Arterial pulse wave pressure transducer [NASA-CASE-GSC-11531-1]
N74-27566
- BLOOD VOLUME**
Plasma volume changes during acute exposure to a high environmental temperature
A74-36212
- Influence of hypoxia on tidal volume response to CO₂ in decerebrate cats
A74-37739
- BODY KINEMATICS**
Kinematic characteristics of motion of the human head in different planes
N74-28587
- BODY TEMPERATURE**
Respiratory heat loss at increased core temperature
A74-36219
- BRADYCARDIA**
Effect of high ambient pressure on human apneic bradycardia
A74-36220
- BRAIN**
Brain catechol synthesis - Control by brain tyrosine concentration
A74-35335
- Detection of the K-complex in human EEG sleep records [AD-777243]
N74-27560
- BRIGHTNESS DISCRIMINATION**
The apparent heaviness of colours
A74-36422
- BUFFETING**
The effects of sustained acceleration, airframe buffet, and aircraft flying qualities on tracking performance [AIAA PAPER 74-793]
A74-37813
- C**
- C-141 AIRCRAFT**
Development of a litter access device for C-141 aeromedical aircraft [AD-777147]
N74-27578
- CABIN ATMOSPHERES**
Ozone in aircraft cabins
A74-36465
- Experiment with the incorporation of vegetable plants in a semiclosed life support system --- for oxygen and food production during manned space flight
N74-28576
- CALCIUM METABOLISM**
Normal serum calcium levels in Air Force flying personnel
A74-36473
- Effect of thyrocalcitonin on water-mineral metabolism in rabbits during prolonged restriction of mobility
N74-28572
- CARBOHYDRATE METABOLISM**
Heart rate and energy-yielding substrates in blood during long-lasting running
A74-36398
- CARBON**
Carbon and the biosphere --- conference [CONF-720510]
N74-28621
- CARBON DIOXIDE**
Influence of hypoxia on tidal volume response to CO₂ in decerebrate cats
A74-37739
- CARBON DIOXIDE CONCENTRATION**
Oxygen consumption by rats during prolonged breathing of an atmosphere with an increased carbon dioxide content
N74-28591
- CARBON MONOXIDE**
Effect of carbon monoxide on cardiac weight as compared with altitude effects
A74-36218
- CARDIAC AURICLES**
An improved method for echographic detection of left atrial enlargement
A74-36975
- CARDIAC VENTRICLES**
Echocardiographic assessment of left ventricular function with special reference to normalized velocities
A74-36974
- Detection of hypokinesia by a quantitative analysis of left ventricular cineangiograms
A74-36979
- CARDIOGRAPHY**
Cardiac rhythm computer analysis techniques [NASA-TT-P-15733]
N74-27574
- CAROTID SINUS REFLEX**
Influence of hypoxia on tidal volume response to CO₂ in decerebrate cats
A74-37739
- Some observations on the homogeneity of response of single chemoreceptor fibres --- in cat carotid sinus nerve
A74-37740
- CATECHOLAMINE**
Effect of coriolis acceleration accumulation on catecholamine excretion [NASA-TT-P-15736]
N74-27547
- CATHODE RAY TUBES**
A dynamic test method for investigations of electronic displays --- noting readability
N74-28636
- CELLS (BIOLOGY)**
Fine structure of tannin accumulations in callus cultures of Pinus elliotti / slash pine/
A74-36195
- Proteolytic enzymes and protein metabolism in rabbit erythrocytes during cell maturation in vivo [NASA-TM-X-15731]
N74-27555
- Hepatic pathology in mice after continuous inhalation exposure to 1, 1, 1-trichloroethane [NASA-CR-134322]
N74-27556
- Ultraviolet fluorescence of myeloid cells in the bone marrow of dogs exposed to chronic radiation
N74-28588
- Effects of vitamins on the penetration of lipoate-S sup 35 into the cells of animals subjected to acceleration
N74-28589
- The protective effect of a constant magnetic field --- reduction of molecular cell pathology
N74-28615
- CENTRAL NERVOUS SYSTEM**
The human operator in a tracking task - Foresight and strategy
A74-37009
- Influence of hypoxia on tidal volume response to CO₂ in decerebrate cats
A74-37739
- CENTRIPUGING STRESS**
Quantitative effect of linear acceleration on positional alcohol nystagmus
A74-36466
- Observations on saccules of rats exposed to long-term hypergravity
A74-36468
- Prediction of acceleration tolerance by means of a decompression functioning test
A74-37532
- CEREBRAL CORTEX**
Cortical and intracortical study of parietal and temporal evoked visual potentials in photosensitive baboons
A74-36359
- On functions and structure of deep layers of immature auditory cortex
A74-36362

CHEMICAL COMPOSITION

SUBJECT INDEX

CHEMICAL COMPOSITION

Peculiarities of the chemical composition of green plants during their prolonged cultivation on an ionite substrate

N74-28577

Discovery of amino acids in regions of present-day volcanic activity

N74-28590

CHEMORECEPTORS

Some observations on the homogeneity of response of single chemoreceptor fibres --- in cat carotid sinus nerve

A74-37740

CHEMOTHERAPY

Effect of isiparamine, nitrazepam and sodium hydroxybutyrate on sleep impairments caused by emotional stress

N74-28575

CHLORELLA

Experiment with the incorporation of vegetable plants in a semiclosed life support system --- for oxygen and food production during manned space flight

N74-28576

CHOLINESTERASE

Effect of cutting off the septal afferentia on acetylcholinesterase activity in the short-axon neurons of the hippocampus

A74-36936

CHROMIUM ALLOYS

The problem of skin diseases in workers engaged in the machining of chromium alloyed steels

[AD-77692B] N74-28626

CINEMATOGRAPHY

Detection of hypokinesia by a quantitative analysis of left ventricular cineangiograms

A74-36979

CIRCADIAN RHYTHMS

Studies of peripheral circulatory rhythms in resting and exercising humans

A74-36228

Glossary of selected chronobiologic terms

A74-36229

Regularity in the control of the free-running sleep-wakefulness rhythm

A74-36467

Changes in the diurnal variations of simulated pilot activity after time shift due to air travel through several time zones

[ESRO-TT-49] N74-28622

CIVIL AVIATION

Research in aviation psychology; European Congress on Aviation Psychology, 10th, Paris, France, September 11-15, 1973, Transactions

A74-36995

Study of relations among the behavioral patterns, sociometric indices, and performance in pilot training at a commercial aviation school

A74-37002

CLASSIFICATIONS

The Myxomycetes

[NASA-CR-138841] N74-28558

CLEANING

Laboratory demonstration model: Active cleaning technique device --- for removal of contaminants from an optical surface

[NASA-CR-120292] N74-28631

CLINICAL MEDICINE

Clinical problems and stress in air traffic control

A74-35700

Diseases due to pollutions

[APRIC-41124] N74-27552

Human cytomegalovirus (CMV) and indirect immunofluorescence in disseminated Lupus erythematosus

[NASA-TT-F-15712] N74-28565

Studies on the detection of clinically silent involvement of muscle in lupus erythematosus

[NASA-TT-P-15804] N74-28620

CLOSED CIRCUIT TELEVISION

Helicopter flight investigation to determine the effects of a closed-circuit TV on performance of a precision sling-load handling task

[AHS PREPRINT 862] A74-36602

CLOSED ECOLOGICAL SYSTEMS

Problems in the selection of personnel operators for closed ecologic systems and prophylactic measures for neuropsychic disorders --- effects of social isolation

N74-27583

Experiment with the incorporation of vegetable plants in a semiclosed life support system --- for oxygen and food production during manned space flight

N74-28576

COLD TOLERANCE

Determination of the zone of thermal neutrality in water

[RAE-LIB-TRANS-1704] N74-27546

COLLAGENS

Haidinger's brushes and predominant orientation of collagen in corneal stroma

A74-36421

COLLIMATORS

Display collimation under whole-body vibration

A74-36755

COLOR

Step size in the Munsell color order system

N74-27567

COLOR VISION

The format and color of small matrix displays for use in high ambient illumination

A74-35565

Haidinger's brushes and predominant orientation of collagen in corneal stroma

A74-36421

The apparent heaviness of colours

A74-36422

Sight and mind: An introduction to visual perception --- Book

A74-36771

Porn-specific colour after effects in scotopic illumination

A74-37047

Peripheral visual response time to colored stimuli imaged on the horizontal meridian

[NASA-TM-X-3086] N74-27557

COLUMNS (PROCESS ENGINEERING)

Transphoresis and isotachophoresis as preparative techniques with reference to zero-gravity

[AIAA PAPER 74-664] A74-35911

COBBAT

Effect of nap-of-the-earth requirements on aircrew performance during night attack helicopter operations

[AHS PREPRINT 863] A74-36603

COMFORT

Effect of motion frequency spectrum on subjective comfort response --- modeling passenger reactions to commercial aircraft flights

[REPT-403212] N74-28630

COMMERCIAL AIRCRAFT

Effect of motion frequency spectrum on subjective comfort response --- modeling passenger reactions to commercial aircraft flights

[REPT-403212] N74-28630

COMPUTER PROGRAMS

A method for evaluating computer programs for electrocardiographic interpretation. I - Application to the experimental IBM program of 1971

A74-36976

A method for evaluating computer programs for electrocardiographic interpretation. II - Application to version D of the PHS program and the Mayo Clinic program of 1968

A74-36977

A method for evaluating computer programs for electrocardiographic interpretation. III - Reproducibility testing and the sources of program errors

A74-36978

COMPUTER TECHNIQUES

The development of an experimental human-operator sensory system

A74-37011

Biomedical engineering tasks --- electrode development for electrocardiography and electroencephalography

[NASA-CR-128733] N74-27570

Cardiac rhythm computer analysis techniques

[NASA-TT-F-15733] N74-27574

COMPUTERIZED SIMULATION

- Study to design and develop remote manipulator system --- computer simulation of human performance
[NASA-CR-137528] N74-27571
- G-189A analytical simulation of the integrated waste management-water system using radioisotopes for thermal energy
[NASA-CR-120251] N74-28629

CONDITIONED REFLEXES

- Response-produced timeouts under a progressive-ratio schedule with a punished reset option
A74-35988

CONFERENCES

- Vibrational technology: Criteria for shock effects and shock tolerance; Colloquium, Technische Hochschule Darmstadt, Darmstadt, West Germany, April 9, 10, 1973, Reports
A74-36682
- Research in aviation psychology; European Congress on Aviation Psychology, 10th, Paris, France, September 11-15, 1973, Transactions
A74-36995
- Carbon and the biosphere --- conference
[CONF-720510] N74-28621

CONTACT LENSES

- Soft (hydrophilic) contact lenses in US Army aviation: An investigative study of the Bausch and Lomb Soflens
[AD-776353] N74-27580

CONTROL EQUIPMENT

- The optimization of control gain by self-adjustment
A74-36658

CONTROL THEORY

- Application of modern control theory to the design of man-machine systems
[AD-777163] N74-28643

COOLING

- Objective approach to a design of a whole-body, water-cooled suit
A74-36469

CORIOLIS EFFECT

- Relationship between susceptibility to motion sickness and tolerance to Coriolis forces
A74-36656
- Effect of coriolis acceleration accumulation on catecholamine excretion
[NASA-TT-F-15736] N74-27547
- Peculiarities of the nystagmic reaction in human subjects after exposure to linear acceleration
N74-28583

CORNEA

- Haidinger's brushes and predominant orientation of collagen in corneal stroma
A74-36421

CORONARY CIRCULATION

- Echocardiographic assessment of left ventricular function with special reference to normalized velocities
A74-36974

CRASHES

- User's manual for UCIM vehicle-occupant crash-study model
[AD-778338] N74-28648

CUFFS

- Evaluation of intratracheal cuffs for aeromedical evacuation
[AD-776319] N74-28646

CULTURE TECHNIQUES

- Peculiarities of the chemical composition of green plants during their prolonged cultivation on an ionite substrate
N74-28577

CYTOGENESIS

- Ultraviolet fluorescence of myeloid cells in the bone marrow of dogs exposed to chronic radiation
N74-28588

CYTOLOGY

- Fine structure of tannin accumulations in callus cultures of Pinus elliotti /slash pine/
A74-36195

D

DECISION MAKING

- Vertex evoked potentials in a rating-scale detection task; Relation to signal probability
[NASA-CR-138796] N74-27573

DECOMPRESSION SICKNESS

- Hematological studies after rapid decompression
[ESRO-TT-61] N74-28623

DECONTAMINATION

- Laboratory demonstration model: Active cleaning technique device --- for removal of contaminants from an optical surface
[NASA-CR-120292] N74-28631

DEHYDRATION

- Plasma volume changes during acute exposure to a high environmental temperature
A74-36212
- The influence of dehydration on heat dissipation mechanisms in the rabbit
A74-36358

DEPRESSANTS

- Quantitative effect of linear acceleration on positional alcohol nystagmus
A74-36466

DIAGNOSIS

- Multiple crystal echocardiographic evaluation of endocardial cushion defect
A74-36972

- A method for evaluating computer programs for electrocardiographic interpretation. I - Application to the experimental IBM program of 1971
A74-36976

- A method for evaluating computer programs for electrocardiographic interpretation. II - Application to version D of the PHS program and the Mayo Clinic program of 1968
A74-36977

- A method for evaluating computer programs for electrocardiographic interpretation. III - Reproducibility testing and the sources of program errors
A74-36978

- Detection of hypokinesia by a quantitative analysis of left ventricular cineangiograms
A74-36979

DICTIONARIES

- Glossary of selected chronobiologic terms
A74-36229

DIETS

- Investigation of assimilability of amino acids by man receiving an amino acid mixture --- replacement of protein component in diet
N74-28586

DIGITAL SIMULATION

- A simulation method for the investigation and improvement of interaction at the man-machine interface using a digital computer
N74-28638

DIGITAL TECHNIQUES

- A method for evaluating computer programs for electrocardiographic interpretation. III - Reproducibility testing and the sources of program errors
A74-36978

DIPHTHERIA

- The problem of the periodicity of the epidemic process --- solar activity effects on diphtheria outbreak
N74-28604

DISEASES

- Diseases due to pollutions
[APTIC-41124] N74-27552

DISORIENTATION

- Proposed spatial orientation flight training concept --- using ground based vestibular simulators
A74-36477

DISPLACEMENT MEASUREMENT

- A model for the response of seated humans to sinusoidal displacements of the seat
A74-37924

DISPLAY DEVICES

- Peripheral visual response time and visual display layout
A74-35564

- The format and color of small matrix displays for use in high ambient illumination
A74-35565

- Helicopter flight investigation to determine the effects of a closed-circuit TV on performance of a precision sling-load handling task
[AHS PREPRINT 862] A74-36602

Detection of changes in spatial position. IV -
Multiple display fields, display aiding, and
interference
A74-36751

Display collimation under whole-body vibration
A74-36755

A dynamic test method for investigations of
electronic displays --- noting readability
N74-28636

Transfer of training from predictor to
conventional displays
[AD-777171] N74-28644

DISTILLATION
Vacuum distillation/vapor filtration water recovery
[NASA-CR-120303] N74-28632

DIURNAL VARIATIONS
Changes in the diurnal variations of simulated
pilot activity after time shift due to air
travel through several time zones
[ESRO-TT-49] N74-28622

DIVING (UNDERWATER)
Effect of high ambient pressure on human apneic
bradycardia
A74-36220

DOSIMETERS
Study of blood forming organ dose as a function of
proton environment
[NASA-CR-132475] N74-28561

DRAG
Energetics of swimming in man
A74-36208

DRUGS
Psychopharmacological regulation of
interpersonality relationships in a group
(experimental investigation)
N74-28578

DUMMIES
Shock tests with dummies and their evaluation
A74-36686

DYNAMIC CHARACTERISTICS
Progress in vestibular modeling
A74-35250

DYNAMIC MODELS
A mechanical model of the human ligamentous spine
and its application to the pilot ejection problem
N74-28556

DYNAMIC TESTS
A dynamic test method for investigations of
electronic displays --- noting readability
N74-28636

E

EAR PROTECTORS
Psychological factors related to the voluntary use
of hearing protection in hazardous noise
environments
[AD-777520] N74-27579

EARTH HYDROSPHERE
Atmospheric homeostasis by and for the biosphere -
The Gaia hypothesis
A74-35521

Carbon and the biosphere --- conference
[CONF-720510] N74-28621

ECHOCARDIOGRAPHY
Multiple crystal echocardiographic evaluation of
endocardial cushion defect
A74-36972

The variable spectrum of echocardiographic
manifestations of the mitral valve prolapse
syndrome
A74-36973

Echocardiographic assessment of left ventricular
function with special reference to normalized
velocities
A74-36974

An improved method for echographic detection of
left atrial enlargement
A74-36975

ECOLOGY
Atmospheric homeostasis by and for the biosphere -
The Gaia hypothesis
A74-35521

EDUCATION
Guidelines for a training course in noise survey
techniques
[AD-776631] N74-28645

EFFERENT NERVOUS SYSTEMS
Phrenic motoneuron activity during thermal or
hypocapnic polypnea
A74-36364

EJECTION INJURIES
A mechanical model of the human ligamentous spine
and its application to the pilot ejection problem
N74-28556

ELASTIC PROPERTIES
A mechanical model of the human ligamentous spine
and its application to the pilot ejection problem
N74-28556

ELBOW (ANATOMY)
Treatment of the external epicondylitis of the
humerus with a magnetic field
N74-28619

ELECTRIC DIPOLES
On electrophysiological activity of the normal heart
A74-35673

ELECTRIC EQUIPMENT
Design and fabricate a pair of Rancho
anthropomorphic manipulator arms
[NASA-CR-120275] N74-27568

ELECTRIC STIMULI
Response-produced timeouts under a
progressive-ratio schedule with a punished reset
option
A74-35988

ELECTROCARDIOGRAPHY
On electrophysiological activity of the normal heart
A74-35673

A method for evaluating computer programs for
electrocardiographic interpretation. I -
Application to the experimental IBM program of
1971
A74-36976

A method for evaluating computer programs for
electrocardiographic interpretation. II -
Application to version D of the PHS program and
the Mayo Clinic program of 1968
A74-36977

A method for evaluating computer programs for
electrocardiographic interpretation. III -
Reproducibility testing and the sources of
program errors
A74-36978

Biomedical engineering tasks --- electrode
development for electrocardiography and
electroencephalography
[NASA-CR-128733] N74-27570

ELECTRODES
Biomedical engineering tasks --- electrode
development for electrocardiography and
electroencephalography
[NASA-CR-128733] N74-27570

ELECTROENCEPHALOGRAPHY
Detection of the K-complex in human EEG sleep
records
[AD-777243] N74-27560

Biomedical engineering tasks --- electrode
development for electrocardiography and
electroencephalography
[NASA-CR-128733] N74-27570

ELECTROLYTE METABOLISM
Changes in the plasma electrolyte levels of the
rabbits during acute exposure to simulated high
altitude
A74-36652

Effect of thyrocalcitonin on water-mineral
metabolism in rabbits during prolonged
restriction of mobility
N74-28572

Man's mineral balance during ten-day confinement
at a constant ambient temperature of 40 deg
N74-28584

ELECTROMAGNETIC RADIATION
A review of selected bioeffects thresholds for
various spectral ranges of light
[PB-228391/9] N74-27563

Electromagnetic power deposition in man exposed to
high-frequency fields and the associated thermal
and physiologic consequences
[AD-776821] N74-28627

ELECTROPHORESIS
Transphoresis and isotachophoresis as preparative
techniques with reference to zero-gravity
[AIAA PAPER 74-664] A74-35911

SUBJECT INDEX

FIBRIN

- ELECTROPHYSIOLOGY**
 An evaluation of several cardiac activation models
 A74-36905
 Human binocular summation at absolute threshold
 A74-37907
 Uncertainty sets associated with saccadic eye
 movements - Basis of satisfaction control
 A74-37908
 The electrical response of the eye at varying
 intervals following an adapting flash exposure
 --- electrophysiological and psychophysiological
 observations
 [AD-778342] N74-28628
- EMOTIONAL FACTORS**
 The pilot candidate's image of his profession
 A74-36999
- EMOTIONS**
 Effects of domestic stress upon flying proficiency
 A74-36997
- ENDOCRINE SECRETIONS**
 State of the neurosecretory nuclei of the
 hypothalamus after combined exposure to
 acceleration and ionizing radiation
 N74-28571
 Effect of restricted motor activity on the enzyme
 secretion function of the pancreas and
 extrasecretory function of the liver in rats ---
 body reaction to stress
 N74-28573
- ENERGY REQUIREMENTS**
 Energetics of swimming in man
 A74-36208
- ENVIRONMENTAL INDEX**
 Physiological adjustments to environmental factors
 [AD-777290] N74-27561
- ENZYME ACTIVITY**
 Effect of cutting off the septal afferentia on
 acetylcholinesterase activity in the short-axon
 neurons of the hippocampus
 A74-36936
 Proteolytic enzymes and protein metabolism in
 rabbit erythrocytes during cell maturation in vivo
 [NASA-TM-X-15731] N74-27555
 Aeromonas proteolytica bacteria in aerospace
 environments --- possible genetic alterations
 and effects on man
 [NASA-CR-134328] N74-28560
 Effect of restricted motor activity on the enzyme
 secretion function of the pancreas and
 extrasecretory function of the liver in rats ---
 body reaction to stress
 N74-28573
 Method of magnetobiological indication in clinical
 laboratory practice --- considering
 immunobiological activation
 N74-28613
 Changes in the fibrinogen-fibrin system following
 a 20-hour exposure of rabbits to a magnetic field
 N74-28617
- EPIDEMIOLOGY**
 Results of comparison of the dynamics of the
 epidemic process with changes in the planetary
 index of magnetic disturbance --- statistical
 correlation to solar activities
 N74-28603
 Statistical evaluation of the significance of the
 influence of abrupt changes in solar activity on
 the dynamics of the epidemic process
 N74-28605
- ERROR ANALYSIS**
 A method for evaluating computer programs for
 electrocardiographic interpretation. III -
 Reproducibility testing and the sources of
 program errors
 A74-36978
 The human operator in a tracking task - Foresight
 and strategy
 A74-37009
- ERROR SIGNALS**
 Uncertainty sets associated with saccadic eye
 movements - Basis of satisfaction control
 A74-37908
- ERYTHROCYTES**
 A television method for measuring capillary red
 cell velocities
 A74-36223
- To what extent is the glycolysis in mammalian
 erythrocytes carried out via 2,3
 diphosphoglyceric acid? About a variant of the
 glycolytic cycle on the level of phosphoglyceric
 acids
 [RAE-LIB-TRANS-1724] N74-27545
 Nitrogen metabolism in erythrocyte maturation;
 residual nitrogen formation and hemoglobin
 synthesis
 [NASA-TT-P-15741] N74-27548
 Proteolytic enzymes and protein metabolism in
 rabbit erythrocytes during cell maturation in vivo
 [NASA-TM-X-15731] N74-27555
- ETHYL ALCOHOL**
 Quantitative effect of linear acceleration on
 positional alcohol nystagmus
 A74-36466
- EXCRETION**
 Influence of bedrest and hypercapnia upon urinary
 mineral excretion in man
 A74-36475
 Effect of coriolis acceleration accumulation on
 catecholamine excretion
 [NASA-TT-P-15736] N74-27547
- EXERCISE (PHYSIOLOGY)**
 Heart rate and energy-yielding substrates in blood
 during long-lasting running
 A74-36398
- EXOBIOLOGY**
 Space biology and aerospace medicine, volume 8,
 no. 3, 1974
 [JPRS-62553] N74-28567
- EXPERIMENTAL DESIGN**
 Techniques for man-machine-investigations
 [DLA-MITT-74-03] N74-28634
 Statistical planning of ergonomic experiments.
 Possibilities and usefulness
 N74-28635
- EXPIRATION**
 Variability of maximum expiratory flow-volume curves
 A74-36216
- EXPIRED AIR**
 Respiratory heat loss at increased core temperature
 A74-36219
- EXPOSURE**
 Flashblindness following double flash exposures
 [AD-777698] N74-27562
- EYE (ANATOMY)**
 Ocular damage thresholds for repetitive pulsed
 argon laser exposure
 [AD-777144] N74-28625
 The electrical response of the eye at varying
 intervals following an adapting flash exposure
 --- electrophysiological and psychophysiological
 observations
 [AD-778342] N74-28628
- EYE EXAMINATIONS**
 Ocular hazard from picosecond pulses of Nd:YAG
 laser radiation
 A74-36414
- EYE MOVEMENTS**
 Eye-movements and visual perception --- Book
 A74-37093
 Method for measuring eye movements of pilots,
 exemplified for ILS approaches
 N74-28639
- EYEPIECES**
 Soft (hydrophilic) contact lenses in US Army
 aviation: An investigative study of the Bausch
 and Lomb Softlens
 [AD-776353] N74-27580
- F**
- FATIGUE (BIOLOGY)**
 Changes in the diurnal variations of simulated
 pilot activity after time shift due to air
 travel through several time zones
 [ESRO-TT-49] N74-28622
- FEMALES**
 Women commercial pilots
 A74-37001
 Study of control force limits for female pilots
 [AD-777839] N74-27585
- FIBRIN**
 Change in fibrinolytic activity under the
 influence of a constant magnetic field --- blood
 coagulation normalization in heart patients
 N74-28611

FIBRINOGEN

SUBJECT INDEX

Influence of a constant magnetic field on the fibrinogen-fibrin system --- in blood coagulation process N74-28616

FIBRINOGEN
 Influence of solar activity on fibrinolysis and fibrinogenolysis --- statistical correlation between solar flare and blood coagulation indices N74-28599

Fibrinolysis and fibrinogenolysis on magnetically-active days --- statistical correlation to magnetic storms N74-28600

Influence of synoptic processes on fibrinolysis and fibrinogenolysis in healthy persons --- meteorological effects on blood coagulation N74-28601

The influence of weather on fibrinolysis and fibrinogenolysis --- in human body N74-28602

Influence of a constant magnetic field on the fibrinogen-fibrin system --- in blood coagulation process N74-28616

Changes in the fibrinogen-fibrin system following a 20-hour exposure of rabbits to a magnetic field N74-28617

FLASH BLINDNESS
 Flashblindness following double flash exposures [AD-777698] N74-27562

FLIGHT ALTITUDE
 Ozone in aircraft cabins A74-36465

Effects of aircraft altitude and speed on air-to-ground visual target acquisition A74-36474

FLIGHT CONTROL
 Pilot workload during instrument flight [AHS PREPRINT 820] A74-36624

Study of control force limits for female pilots [AD-777839] N74-27585

FLIGHT CREWS
 Normal serum calcium levels in Air Force flying personnel A74-36473

Psychotherapy for aircrew members A74-36996

Present notions on the psychological selection of aircrews A74-37000

Joint Army Navy air crew impact injury prevention program [AD-777713] N74-27582

Crew system design [AD-777996] N74-28641

Validation of two aircrew psychomotor tests [AD-777830] N74-28642

FLIGHT FITNESS
 Expert evaluation of the state of the nasal sinuses in cosmonaut candidates --- medical diagnostic examinations for astronaut selections N74-28579

FLIGHT INSTRUMENTS
 Consideration of investigation on reading error of aircraft instruments A74-36653

Transfer from audiovisual pretraining to a continuous perceptual motor task [AD-778078] N74-28647

FLIGHT SAFETY
 The dangerous sky: A history of aviation medicine --- Book A74-36775

The role of man in system safety A74-37006

The consequences of degradations of the awake state on ocular positioning by saccadic movements A74-37007

FLIGHT SIMULATION
 Proposed spatial orientation flight training concept --- using ground based vestibular simulators A74-36477

FLIGHT SIMULATORS
 Study of control force limits for female pilots [AD-777839] N74-27585

Effect of motion frequency spectrum on subjective comfort response --- modeling passenger reactions to commercial aircraft flights [BEPT-403212] N74-28630

Layout and performance of anthropotechnical experiments, exemplified by a flight simulator investigation N74-28637

FLIGHT STRESS (BIOLOGY)
 Experimental investigation of the influence of loads of variable sign on pilot efficiency and passenger comfort A74-36564

Display collimation under whole-body vibration A74-36755

The dangerous sky: A history of aviation medicine --- Book A74-36775

Adjustment and maladjustment in elementary pilot training A74-36998

FLIGHT TESTS
 Helicopter flight investigation to determine the effects of a closed-circuit TV on performance of a precision sling-load handling task [AHS PREPRINT 862] A74-36602

FLIGHT TIME
 The analysis of aviation training evaluations. I - Effects of flying hours upon training evaluations A74-36655

FLIGHT TRAINING
 The analysis of aviation training evaluations. I - Effects of flying hours upon training evaluations A74-36655

Transfer of training from predictor to conventional displays [AD-777171] N74-28644

FLOW DISTRIBUTION
 Effect of inspiratory flow rate on regional distribution of inspired gas A74-36209

FLOW MEASUREMENT
 Variability of maximum expiratory flow-volume curves A74-36216

A television method for measuring capillary red cell velocities A74-36223

FLOW RESISTANCE
 Effect of inspiratory flow rate on regional distribution of inspired gas A74-36209

FLOW VELOCITY
 Effect of inspiratory flow rate on regional distribution of inspired gas A74-36209

FLOWMETERS
 Ultrasonic Doppler measurement of renal artery blood flow [NASA-CR-138902] N74-28595

FLUORESCENCE
 Ultraviolet fluorescence of myeloid cells in the bone marrow of dogs exposed to chronic radiation N74-28588

FOOD
 Experimental data on the influence of irradiation of food products by protons and gamma radiation --- considering radiation absorption by astronauts N74-28569

FOREARM
 A comparison of regional blood flow and oxygen utilization during dynamic forearm exercise in normal subjects and patients with congestive heart failure A74-36980

FRACTIONATION
 Step size in the Munsell color order system N74-27567

FREE ENERGY
 Thermodynamics and the origin of life --- emphasizing free energy A74-37437

FRONTS (METEOROLOGY)
 Influence of synoptic processes on fibrinolysis and fibrinogenolysis in healthy persons --- meteorological effects on blood coagulation N74-28601

FUNGI
 The Myxomycetes [NASA-CR-138841] N74-28558

G

GAS BAGS
Air bag restraint systems --- for motor vehicle operators
[PB-227749/9] N74-27584

GAS EXCHANGE
Diffusional and metabolic components of nitrogen elimination through the lungs A74-36211
Hypoxia and tissue gas exchange [AD-777158] N74-27558

GAS FLOW
Hypoxia and tissue gas exchange [AD-777158] N74-27558

GASEOUS DIFFUSION
Diffusional and metabolic components of nitrogen elimination through the lungs A74-36211

GENERALIZATION (PSYCHOLOGY)
The generalization function in monkeys - Physiological aspect A74-37325

GLYCOLYSIS
To what extent is the glycolysis in mammalian erythrocytes carried out via 2,3 diphosphoglyceric acid? About a variant of the glycolytic cycle on the level of phosphoglyceric acids [RAE-LIB-TRANS-1724] N74-27545

GROUP DYNAMICS
Psychopharmacological regulation of interpersonality relationships in a group (experimental investigation) N74-29578

GROWTH
Proteolytic enzymes and protein metabolism in rabbit erythrocytes during cell maturation in vivo [NASA-TM-X-15731] N74-27555

GUINEA PIGS
A comparison of the effects of SO₂, NO₂ and O₃ on the pulmonary ventilation: Guinea pig exposure experiments [APTIC-15680] N74-28559

HAND (ANATOMY)
Reaction of the resistive and capacitive vessels of the hand at the start of muscular exercise A74-36360

HAZARDS
Psychological factors related to the voluntary use of hearing protection in hazardous noise environments [AD-777520] N74-27579

HEAD MOVEMENT
Tolerance to rotation with continuous and intermittent head movements [NASA-TT-F-15753] N74-27549
Kinematic characteristics of motion of the human head in different planes N74-28587

HEALTH PHYSICS
A review of selected bioeffects thresholds for various spectral ranges of light [PB-228391/9] N74-27563

HEART
Effect of carbon monoxide on cardiac weight as compared with altitude effects A74-36218

HEART DISEASES
Multiple crystal echocardiographic evaluation of endocardial cushion defect A74-36972
The variable spectrum of echocardiographic manifestations of the mitral valve prolapse syndrome A74-36973
An improved method for echographic detection of left atrial enlargement A74-36975
A method for evaluating computer programs for electrocardiographic interpretation. I - Application to the experimental IBM program of 1971 A74-36976

A method for evaluating computer programs for electrocardiographic interpretation. II - Application to version D of the PHS program and the Mayo Clinic program of 1968 A74-36977

Detection of hypokinesia by a quantitative analysis of left ventricular cineangiograms A74-36979

A comparison of regional blood flow and oxygen utilization during dynamic forearm exercise in normal subjects and patients with congestive heart failure A74-36980

Hemodynamics in obesity: A brief review [NASA-TT-F-15826] N74-28562

Effect of magnetic bracelets on the coagulation and anticoagulation systems of the blood of patients with hypertension N74-28618

HEART FUNCTION
On electrophysiological activity of the normal heart A74-35673
Cardiopulmonary function in prospective competitive swimmers and their parents A74-36210
An evaluation of several cardiac activation models A74-36905
Echocardiographic assessment of left ventricular function with special reference to normalized velocities A74-36974

HEART RATE
Reaction of the resistive and capacitive vessels of the hand at the start of muscular exercise A74-36360
Heart rate and energy-yielding substrates in blood during long-lasting running A74-36398
Results of telemetric stress measurements of pulse-and respiratory frequency on the VJ 101 C - X 2, and a proposal for the use of a standardized evaluation program for the future treatment of such investigations N74-28640

HEART VALVES
The variable spectrum of echocardiographic manifestations of the mitral valve prolapse syndrome A74-36973

HEAT ACCLIMATIZATION
Effect of heat on growth hormone secretion and adrenal cortex activity in rats A74-36363

HEAT SOURCES
G-189A analytical simulation of the integrated waste management-water system using radioisotopes for thermal energy [NASA-CR-120251] N74-28629

HEAT TOLERANCE
Thermal tolerance of blood serum in dogs subjected to combined exposure to X-radiation and reduced barometric pressure N74-28594
Electromagnetic power deposition in man exposed to high-frequency fields and the associated thermal and physiologic consequences [AD-776821] N74-28627

HEAVY LIFT HELICOPTERS
Helicopter flight investigation to determine the effects of a closed-circuit TV on performance of a precision sling-load handling task [AHS PREPRINT 862] A74-36602

HELICOPTER CONTROL
Visual and manual workload of the helicopter pilot [AHS PREPRINT 821] A74-36625

HELICOPTER PERFORMANCE
Helicopter flight investigation to determine the effects of a closed-circuit TV on performance of a precision sling-load handling task [AHS PREPRINT 862] A74-36602

HELMETS
All-exotic materials used in NASA's Skylab/Space Shuttle crews' bump protective helmets A74-35839

HEMATOLOGY
Hematological studies after rapid decompression [ESRO-TT-61] N74-28623

HEMODYNAMIC RESPONSES

SUBJECT INDEX

HEMODYNAMIC RESPONSES

- Hemodynamic and respiratory responses compared in swimming and running
A74-36214
- HEMODYNAMICS**
Renal parameter estimates in unrestrained dogs
A74-37911
- HEMOGLOBIN**
Nitrogen metabolism in erythrocyte maturation; residual nitrogen formation and hemoglobin synthesis
[NASA-TT-F-15741] N74-27548
- HEMOLYSIS**
Aeromonas proteolytica bacteria in aerospace environments --- possible genetic alterations and effects on man
[NASA-CR-134328] N74-28560
- HEMORRHAGES**
Tissue gases during hypovolemic shock
A74-36221
- HEREDITY**
Cardiopulmonary function in prospective competitive swimmers and their parents
A74-36210
- HIGH ALTITUDE**
Ozone in aircraft cabins
A74-36465
- HIGH ALTITUDE ENVIRONMENTS**
Oxygen deficit and debt in submaximal exercise at sea level and high altitude
A74-36213
Changes in the plasma electrolyte levels of the rabbits during acute exposure to simulated high altitude
A74-36652
- HIGH GRAVITY ENVIRONMENTS**
Observations on saccules of rats exposed to long-term hypergravity
A74-36468
- HIGH TEMPERATURE ENVIRONMENTS**
Interactions, range effects, and comparisons between tasks in experiments measuring performance with pairs of stresses - Mild heat and 1 mg of L-hyoscyne hydrobroside
A74-36472
Man's mineral balance during ten-day confinement at a constant ambient temperature of 40 deg
N74-28584
- HIGH VACUUM**
Long term effect on high vacuum on microorganisms
[NASA-TT-F-15720] N74-28564
- HIPPOCAMPUS**
Effect of cutting off the septal afferentia on acetylcholinesterase activity in the short-axon neurons of the hippocampus
A74-36936
- HISTOLOGY**
On functions and structure of deep layers of immature auditory cortex
A74-36362
- HOMEOSTASIS**
Atmospheric homeostasis by and for the biosphere - The Gaia hypothesis
A74-35521
- HUMAN BEHAVIOR**
Study of relations among the behavioral patterns, sociometric indices, and performance in pilot training at a commercial aviation school
A74-37002
Effects of sonic boom on automobile-driver behaviour
[UTIAS-TN-188] N74-27576
Psychological factors related to the voluntary use of hearing protection in hazardous noise environments
[AD-777520] N74-27579
- HUMAN BEINGS**
Human cytomegalovirus (CMV) and indirect immunofluorescence in disseminated Lupus erythematosus
[NASA-TT-F-15712] N74-28565
- HUMAN BODY**
Determination of the zone of thermal neutrality in water
[RAE-LIB-TRANS-1704] N74-27546
Concerning the effects of air pollution on the human organism in the Yokkaichi region
[APTIC-47896] N74-27554
- A mechanical model of the human ligamentous spine and its application to the pilot ejection problem
N74-28556
- Study of the possibility of use of decompression of the lower body in diagnosis of body predisposition to a syncopal state --- for pilot selection
N74-28581
- Characteristics of the immunological state of man during hypoxic hypoxia
N74-28582
- Man's mineral balance during ten-day confinement at a constant ambient temperature of 40 deg
N74-28584
- Investigation of the state of human lipid metabolism in sealed chambers
N74-28585
- Investigation of assimilability of amino acids by man receiving an amino acid mixture --- replacement of protein component in diet
N74-28586
- Notes on the concept of normal values employed in clinical practice --- statistical correlation with environment effects
N74-28598
- HUMAN FACTORS ENGINEERING**
Man as a precious resource - The enhancement of human effectiveness in air transport operations
A74-36323
Objective approach to a design of a whole-body, water-cooled suit
A74-36469
G suit filling pressures determined by seat back angle
A74-36476
Effect of the psychophysiological properties of a pilot on the choice of the dynamic characteristics of an aircraft
A74-36506
Experimental investigation of the influence of loads of variable sign on pilot efficiency and passenger comfort
A74-36564
Effect of nap-of-the-earth requirements on aircrew performance during night attack helicopter operations
[AHS PREPRINT 863] A74-36603
Pilot workload during instrument flight
[AHS PREPRINT 820] A74-36624
Visual and manual workload of the helicopter pilot
[AHS PREPRINT 821] A74-36625
Consideration of investigation on reading error of aircraft instruments
A74-36653
Experimental evaluation of an airborne illumination system
A74-36754
The role of man in system safety
A74-37006
Human factors principles in map design
A74-37008
A model for the response of seated humans to sinusoidal displacements of the seat
A74-37924
Data on the acoustic comfort of passengers in railroad cars and soundproofing recommendations
N74-28398
Some NASA contributions to human factors engineering: A survey
[NASA-SP-5117] N74-28633
Techniques for man-machine-investigations
[DLR-MITT-74-03] N74-28634
Statistical planning of ergonomic experiments. Possibilities and usefulness
N74-28635
Crew system design
[AD-777996] N74-28641
Application of modern control theory to the design of man-machine systems
[AD-777163] N74-28643
- HUMAN PATHOLOGY**
Level, peculiarities and effects of coal mine noise on pit workers --- correlation between noise intensity and hearing impairment
N74-28390
Hemodynamics in obesity: A brief review
[NASA-TT-F-15826] N74-28562

SUBJECT INDEX

HYPERTHERMIA

- Treatment of the external epicondylitis of the humerus with a magnetic field N74-28619
- HUMAN PERFORMANCE**
- Clinical problems and stress in air traffic control A74-35700
- Energetics of swimming in man A74-36208
- Man as a precious resource - The enhancement of human effectiveness in air transport operations A74-36323
- Comparative investigations of the learning process in tracking tests of constant or quasi-constant and self-adapting difficulty level. I - Middle learning level - Reliability - Antagonism learning/fatigue. II - Differential diagnostic parameters - Relevant or irrelevant additional signals A74-36399
- Interactions, range effects, and comparisons between tasks in experiments measuring performance with pairs of stresses - Mild heat and 1 mg of L-hyoscyne hydrobromide A74-36472
- Effects of aircraft altitude and speed on air-to-ground visual target acquisition A74-36474
- Sequential task performance - Task module relationships, reliabilities, and times A74-36752
- Stress and the air traffic controller A74-37010
- Effects of background event rate and critical signal amplitude on vigilance performance A74-37373
- Studies on visual pattern recognition in man and animals A74-37910
- Study to design and develop remote manipulator system --- computer simulation of human performance [NASA-CR-137528] N74-27571
- HUMAN REACTIONS**
- Peripheral visual response time and visual display layout A74-35564
- The format and color of small matrix displays for use in high ambient illumination A74-35565
- Hemodynamic and respiratory responses compared in swimming and running A74-36214
- Body composition, sinking force, and oxygen uptake of man treading water A74-36215
- Effect of high ambient pressure on human apneic bradycardia A74-36220
- Regularity in the control of the free-running sleep-wakefulness rhythm A74-36467
- Human factors principles in map design A74-37008
- The effect of stochastic /mechanical/ vibrations on physiological and psychological functions and on subjective perception A74-37075
- A model for the response of seated humans to sinusoidal displacements of the seat A74-37924
- Doctor in space --- Skylab crew medical experiences A74-38027
- Vertex evoked potentials in a rating-scale detection task: Relation to signal probability [NASA-CR-138796] N74-27573
- Psychopharmacological regulation of interpersonal relationships in a group (experimental investigation) N74-28578
- Peculiarities of the nystagmic reaction in human subjects after exposure to linear acceleration N74-28583
- Reactions of the nervous system to magnetic fields N74-28606
- Effect of motion frequency spectrum on subjective comfort response --- modeling passenger reactions to commercial aircraft flights [REPT-403212] N74-28630
- HUMAN TOLERANCES**
- Oxygen deficit and debt in submaximal exercise at sea level and high altitude A74-36213
- Relationship between susceptibility to motion sickness and tolerance to Coriolis forces A74-36656
- Impedance measurements for the development of a nonlinear model of supine man A74-36685
- Shock tests with dummies and their evaluation A74-36686
- Human tolerance to shock - Evaluation criteria and limiting values A74-36688
- Evidence of altered regulation of ventilation during exposure to hypoxia A74-37742
- Tolerance to rotation with continuous and intermittent head movements [NASA-TT-F-15753] N74-27549
- Studies on room ozonizers and on ozone occurrence in the outside air and in industrial plants [APTIC-07834] N74-27551
- Contribution to the optimization of the oscillatory properties of a vehicle: Physiological foundations of comfort during oscillations [RAE-LIB-TRANS-1707] N74-27569
- HUMAN WASTES**
- Development of integrated, zero-g pneumatic transporter/rotating paddle incinerator/catalytic afterburner subsystem for processing human wastes on board spacecraft [NASA-CR-114763] N74-27575
- HUMIDITY**
- Development of an electronic nebulized-humidifier [AD-778082] N74-27564
- HYDROCARBONS**
- A study of the biological effect of continuous inhalation exposure of 1, 1, 1-trichloroethane (methyl chloroform) on animals [NASA-CR-134323] N74-27550
- Hepatic pathology in mice after continuous inhalation exposure to 1, 1, 1-trichloroethane [NASA-CR-134322] N74-27556
- HYDROGEN**
- Microbial detection method based on sensing molecular hydrogen A74-36374
- HYDROXYL COMPOUNDS**
- To what extent is the glycolysis in mammalian erythrocytes carried out via 2,3 diphosphoglyceric acid? About a variant of the glycolytic cycle on the level of phosphoglyceric acids [RAE-LIB-TRANS-1724] N74-27545
- HYPERBARIC CHAMBERS**
- Spirographic investigation of the ventilatory lung function under hyperbaric conditions A74-36400
- HYPERCAPNIA**
- Influence of bedrest and hypercapnia upon urinary mineral excretion in man A74-36475
- HYPEROXIA**
- Oxygen effects on mortality of mice infected with Diplococcus pneumoniae A74-36471
- Accumulation of quinones in the bodies of mice during hyperoxia N74-28574
- HYPERPNEA**
- Study of the ventilation function during thermal or hypocapnic polypnea A74-36361
- HYPERTENSION**
- Hemodynamics in obesity: A brief review [NASA-TT-F-15826] N74-28562
- Effect of magnetic bracelets on the coagulation and anticoagulation systems of the blood of patients with hypertension N74-28618
- HYPERTHERMIA**
- Plasma volume changes during acute exposure to a high environmental temperature A74-36212
- Respiratory heat loss at increased core temperature A74-36219

HYPERVOLEMIA

- Study of the ventilation function during thermal or hypocapnic polypnea A74-36361
 Phrenic motoneuron activity during thermal or hypocapnic polypnea A74-36364

HYPERVOLEMIA

- Tissue gases during hypovolemic shock A74-36221

HYPOBARIC ATMOSPHERES

- Thermal tolerance of blood serum in dogs subjected to combined exposure to X-radiation and reduced barometric pressure N74-28594

HYPOCAPNIA

- Study of the ventilation function during thermal or hypocapnic polypnea A74-36361
 Phrenic motoneuron activity during thermal or hypocapnic polypnea A74-36364

HYPODYNAMIA

- The effect of three day hypodynamia on liver function [NASA-TT-P-15646] N74-28566

HYPOGLYCEMIA

- Blood sugar levels in rats exposed to varying altitude stress for different periods of time A74-36470

HYPOKINESIA

- Effect of thyrocalcitonin on water-mineral metabolism in rabbits during prolonged restriction of mobility N74-28572
 Effect of restricted motor activity on the enzyme secretion function of the pancreas and extrasecretory function of the liver in rats --- body reaction to stress N74-28573

HYPOTHALAMUS

- The influence of dehydration on heat dissipation mechanisms in the rabbit A74-36358
 Study of the ventilation function during thermal or hypocapnic polypnea A74-36361
 State of the neurosecretory nuclei of the hypothalamus after combined exposure to acceleration and ionizing radiation N74-28571

HYPOXIA

- Effects of hypoxia on peripheral visual response to rapid sustained stimulation A74-36217
 Blood sugar levels in rats exposed to varying altitude stress for different periods of time A74-36470
 Oxygen effects on mortality of mice infected with Diplococcus pneumoniae A74-36471
 Changes in the plasma electrolyte levels of the rabbits during acute exposure to simulated high altitude A74-36652
 Effects of acute exposure to hypobaric hypoxia on water contents in the blood and several tissues in the rat A74-36654
 Influence of hypoxia on tidal volume response to CO2 in decerebrate cats A74-37739
 Evidence of altered regulation of ventilation during exposure to hypoxia A74-37742
 Hypoxia and tissue gas exchange [AD-777158] N74-27558
 A two compartmental model of the respiratory system [PB-228669/8] N74-27565
 Characteristics of the immunological state of man during hypoxic hypoxia N74-28582

IMMUNITY

- Characteristics of the immunological state of man during hypoxic hypoxia N74-28582

SUBJECT INDEX

IMMUNOLOGY

- Method of magnetobiological indication in clinical laboratory practice --- considering immunobiological activation N74-28613

IMPACT LOADS

- Shock tests with dummies and their evaluation A74-36686

IMPACT RESISTANCE

- All-exotic materials used in NASA's Skylab/Space Shuttle crews' bump protective helmets A74-35839

IMPACT TOLERANCES

- Vibrational technology: Criteria for shock effects and shock tolerance; Colloquium, Technische Hochschule Darmstadt, Darmstadt, West Germany, April 9, 10, 1973, Reports A74-36682
 Parameters for the description of shock effects and shock tolerance limits A74-36687
 Human tolerance to shock - Evaluation criteria and limiting values A74-36688
 The shock test, its problems at the present time and in the future A74-36689

IMPEDANCE MEASUREMENTS

- Impedance measurements for the development of a nonlinear model of supine man A74-36685

INCINERATORS

- Development of integrated, zero-g pneumatic transporter/rotating paddle incinerator/catalytic afterburner subsystem for processing human wastes on board spacecraft [NASA-CR-114763] N74-27575

INDUSTRIAL SAFETY

- The problem of skin diseases in workers engaged in the machining of chromium alloyed steels [AD-776928] N74-28626

INFECTIOUS DISEASES

- Oxygen effects on mortality of mice infected with Diplococcus pneumoniae A74-36471
 Acute lupus erythematosus with complete deficiency of the C4 fraction of complement [NASA-TT-P-15727] N74-28563
 Human cytomegalovirus (CMV) and indirect immunofluorescence in disseminated lupus erythematosus [NASA-TT-P-15712] N74-28565
 Studies on the detection of clinically silent involvement of muscle in lupus erythematosus [NASA-TT-P-15804] N74-28620

INHIBITION

- Evidence for the inhibition hypothesis in expanded angle illusion A74-37046

INJURIES

- Joint Army Navy air crew impact injury prevention program [AD-77713] N74-27582

INSTRUMENT FLIGHT RULES

- Pilot workload during instrument flight [AHS PREPRINT 820] A74-36624

INSTRUMENT LANDING SYSTEMS

- Method for measuring eye movements of pilots, exemplified for ILS approaches N74-28639

INTERFACES

- A simulation method for the investigation and improvement of interaction at the man-machine interface using a digital computer N74-28638

ION EXCHANGE RESINS

- Peculiarities of the chemical composition of green plants during their prolonged cultivation on an ionite substrate N74-28577

ION EXTRACTION

- Transphoresis and isotachophoresis as preparative techniques with reference to zero-gravity [AIAA PAPER 74-664] A74-35911

IONIZING RADIATION

- Experimental data on the influence of irradiation of food products by protons and gamma radiation --- considering radiation absorption by astronauts N74-28569

SUBJECT INDEX

MAGNETIC EFFECTS

Influence of functional loads on the state of the phagocytic function of blood in dogs subjected to chronic gamma-irradiation --- physiological defense mechanisms to irradiation
N74-28592

K

KIDNEYS
Renal parameter estimates in unrestrained dogs
A74-37911
Ultrasonic Doppler measurement of renal artery blood flow
[NASA-CR-138902]
N74-28595

L

LASER OUTPUTS
Ocular hazard from picosecond pulses of Nd:YAG laser radiation
A74-36414

LEARNING
Comparative investigations of the learning process in tracking tests of constant or quasi-constant and self-adapting difficulty level. I - Middle learning level - Reliability - Antagonism learning/fatigue. II - Differential diagnostic parameters - Relevant or irrelevant additional signals
A74-36399
Sequential task performance - Task module relationships, reliabilities, and times
A74-36752

LEARNING THEORY
The generalization function in monkeys - Physiological aspect
A74-37325

LEGIBILITY
Human factors principles in map design
A74-37008

LESIONS
Acute lupus erythematosus with complete deficiency of the C4 fraction of complement
[NASA-TT-F-15727]
N74-28563

LETHALITY
The problem of the periodicity of the epidemic process --- solar activity effects on diphtheria outbreak
N74-28604

LEUKOCYTES
Human cytomegalovirus (CMV) and indirect immunofluorescence in disseminated Lupus erythematosus
[NASA-TT-F-15712]
N74-28565
Influence of functional loads on the state of the phagocytic function of blood in dogs subjected to chronic gamma-irradiation --- physiological defense mechanisms to irradiation
N74-28592

LIFE SCIENCES
Heliobiology, its development, successes and tasks --- solar activity effects on life on earth
N74-28597

LIGAMENTS
A mechanical model of the human ligamentous spine and its application to the pilot ejection problem
N74-28556

LIGHT (VISIBLE RADIATION)
Haidinger's brushes and predominant orientation of collagen in corneal stroma
A74-36421

LIGHT ADAPTATION
Flashblindness following double flash exposures
[AD-777698]
N74-27562
The electrical response of the eye at varying intervals following an adapting flash exposure --- electrophysiological and psychophysiological observations
[AD-778342]
N74-28628

LIGHT EMITTING DIODES
The format and color of small matrix displays for use in high ambient illumination
A74-35565

LIGHTING EQUIPMENT
Experimental evaluation of an airborne illumination system
A74-36754

LIMBS (ANATOMY)
Regional vascular changes after functional loading
A74-35525

LINEAR ENERGY TRANSFER (LET)
Dosimetric investigations aboard the Salyut orbital space station --- cosmic radiation measurements
N74-28568

LIPID METABOLISM
Heart rate and energy-yielding substrates in blood during long-lasting running
A74-36398
Investigation of the state of human lipid metabolism in sealed chambers
N74-28585

LIVER
A study of the biological effect of continuous inhalation exposure of 1, 1, 1-trichloroethene (methyl chloroform) on animals
[NASA-CR-134323]
N74-27550
Hepatic pathology in mice after continuous inhalation exposure to 1, 1, 1-trichloroethane
[NASA-CR-134322]
N74-27556
The effect of three day hypodynamia on liver function
[NASA-TT-F-15646]
N74-28566
Effect of restricted motor activity on the enzyme secretion function of the pancreas and extrasecretory function of the liver in rats --- body reaction to stress
N74-28573

LONG TERM EFFECTS
Long term effect on high vacuum on microorganisms
[NASA-TT-F-15720]
N74-28564

LOWER ATMOSPHERE
Carbon and the biosphere --- conference
[CONF-720510]
N74-28621

LUNG MORPHOLOGY
Variability of maximum expiratory flow-volume curves
A74-36216
A comparison of the effects of SO2, NO2 and O3 on the pulmonary ventilation: Guinea pig exposure experiments
[APTIC-15680]
N74-28559
Accumulation of quinones in the bodies of mice during hyperoxia
N74-28574

LUNGS
Effect of inspiratory flow rate on regional distribution of inspired gas
A74-36209
Spirographic investigation of the ventilatory lung function under hyperbaric conditions
A74-36400

M

MACHINING
The problem of skin diseases in workers engaged in the machining of chromium alloyed steels
[AD-776928]
N74-28626

MAGNETIC EFFECTS
Studies in Geomagnetism, aeronomy and solar physics (problems of heliobiology and the biological effect of magnetic fields)
[NASA-TT-F-15862]
N74-28596
Reactions of the nervous system to magnetic fields
N74-28606

Effect of a magnetic field of extremely low intensity on the coagulatory system of the blood
N74-28607
The influence of a constant magnetic field on the coagulatory system of the blood in an experiment
N74-28608
Repeated action of a constant magnetic field on the blood coagulation system in artificially produced anaemia
N74-28609

Change in blood coagulation indices as a function of the incubation period of plasma in a constant magnetic field --- considering heparin tolerance and recalcification
N74-28610

Change in fibrinolytic activity under the influence of a constant magnetic field --- blood coagulation normalization in heart patients
N74-28611

- Influence of a constant and variable magnetic field on the coagulation of human blood in vitro and in vivo N74-28612
- Method of magnetobiological indication in clinical laboratory practice --- considering immunobiological activation N74-28613
- Influence of a constant magnetic field on thrombocytes --- delay of blood coagulation time N74-28614
- The protective effect of a constant magnetic field --- reduction of molecular cell pathology N74-28615
- Influence of a constant magnetic field on the fibrinogen-fibrin system --- in blood coagulation process N74-28616
- Changes in the fibrinogen-fibrin system following a 20-hour exposure of rabbits to a magnetic field N74-28617
- Effect of magnetic bracelets on the coagulation and anticoagulation systems of the blood of patients with hypertension N74-28618
- Treatment of the external epicondylitis of the humerus with a magnetic field N74-28619
- MAGNETIC STORMS**
- Fibrinolysis and fibrinogenolysis on magnetically-active days --- statistical correlation to magnetic storms N74-28600
- MAGNETOSPHERIC INSTABILITY**
- Results of comparison of the dynamics of the epidemic process with changes in the planetary index of magnetic disturbance --- statistical correlation to solar activities N74-28603
- MAN MACHINE SYSTEMS**
- Man as a precious resource - The enhancement of human effectiveness in air transport operations A74-36323
- Effect of nap-of-the-earth requirements on aircrew performance during night attack helicopter operations [AHS PREPRINT 863] A74-36603
- The optimization of control gain by self-adjustment A74-36658
- Investigation methods for manual control processes A74-36659
- Sequential task performance - Task module relationships, reliabilities, and times A74-36752
- The role of man in system safety A74-37006
- The development of an experimental human-operator sensory system A74-37011
- Techniques for man-machine-investigations [DLR-MIT-74-03] N74-28634
- A dynamic test method for investigations of electronic displays --- noting readability N74-28636
- Layout and performance of anthropotechnical experiments, exemplified by a flight simulator investigation N74-28637
- A simulation method for the investigation and improvement of interaction at the man-machine interface using a digital computer N74-28638
- Application of modern control theory to the design of man-machine systems [AD-777163] N74-28643
- MANIPULATORS**
- Design and fabricate a pair of Rancho anthropomorphic manipulator arms [NASA-CR-120275] N74-27568
- MANNED SPACE FLIGHT**
- Aeromonas proteolytica bacteria in aerospace environments --- possible genetic alterations and effects on man [NASA-CR-134328] N74-28560
- Space biology and aerospace medicine, volume 8, no. 3, 1974 [JPRS-62553] N74-28567
- Dosimetric investigations aboard the Salyut orbital space station --- cosmic radiation measurements N74-28568
- Experimental data on the influence of irradiation of food products by protons and gamma radiation --- considering radiation absorption by astronauts N74-28569
- Effectiveness of administration of amytravite and ATP during prolonged irradiation --- effectiveness of prophylactic antiradiation drugs N74-28570
- MANPOWER**
- Man as a precious resource - The enhancement of human effectiveness in air transport operations A74-36323
- MANUAL CONTROL**
- Time-domain analysis of characteristics of the human operator in a simple manual control system A74-35991
- Visual and manual workload of the helicopter pilot [AHS PREPRINT 821] A74-36625
- Investigation methods for manual control processes A74-36659
- The human operator in a tracking task - Foresight and strategy A74-37009
- MAPS**
- Human factors principles in map design A74-37008
- MATHEMATICAL MODELS**
- Progress in vestibular modeling A74-35250
- On electrophysiological activity of the normal heart A74-35673
- Mathematical methods in the study of biological regulatory systems --- Russian book A74-36130
- An evaluation of several cardiac activation models A74-36905
- A model for the response of seated humans to sinusoidal displacements of the seat A74-37924
- A two compartmental model of the respiratory system [PB-228669/8] N74-27565
- MECHANICAL SHOCK**
- Impedance measurements for the development of a nonlinear model of supine man A74-36685
- MEDICAL ELECTRONICS**
- A television method for measuring capillary red cell velocities A74-36223
- MEDICAL EQUIPMENT**
- Development of an electronic nebulized-humidifier [AD-778082] N74-27564
- Evaluation of intratracheal cuffs for aeromedical evacuation [AD-776319] N74-28646
- MEDICAL PHENOMENA**
- Doctor in space --- Skylab crew medical experiences A74-38027
- MEDICAL SCIENCE**
- The dangerous sky: A history of aviation medicine --- Book A74-36775
- MENTAL HEALTH**
- Problems in the selection of personnel operators for closed ecologic systems and prophylactic measures for neuropsychic disorders --- effects of social isolation [AD-777684] N74-27583
- MENTAL PERFORMANCE**
- Detection of changes in spatial position. IV - Multiple display fields, display aiding, and interference A74-36751
- METABOLIC WASTES**
- Microbial detection method based on sensing molecular hydrogen A74-36374
- Influence of bedrest and hypercapnia upon urinary mineral excretion in man A74-36475
- METABOLISM**
- Nitrogen metabolism in erythrocyte maturation; residual nitrogen formation and hemoglobin synthesis [NASA-TT-F-15741] N74-27548

METEOROLOGICAL PARAMETERS

The influence of weather on fibrinolysis and fibrinogenolysis --- in human body N74-28602

MICE
The chronic effects of nitrogen dioxide --- on respiratory systems of mice [APTIC-40168] N74-27553
Hepatic pathology in mice after continuous inhalation exposure to 1, 1, 1-trichloroethane [NASA-CR-134322] N74-27556

MICROINSTRUMENTATION
A micromixing method for determination of oxygen equilibria in blood A74-36222

MICROORGANISMS
The Myxomycetes [NASA-CR-138841] N74-28558

MIGRATION
Techniques development for whale migration tracking [NASA-CR-138830] N74-28557

MILITARY AIRCRAFT
Pilot factor in aircraft accidents of the German Federal Armed Forces A74-37004

MILITARY AVIATION
The analysis of aviation training evaluations. I - Effects of flying hours upon training evaluations A74-36655

MILITARY HELICOPTERS
Effect of map-of-the-earth requirements on aircrew performance during night attack helicopter operations [AHS PREPRINT 863] A74-36603

MILITARY PSYCHOLOGY
Present notions on the psychological selection of aircrews A74-37000
Achievement motivation in pilots-selection A74-37005

MINES (EXCAVATIONS)
Level, peculiarities and effects of coal mine noise on pit workers --- correlation between noise intensity and hearing impairment N74-28390

MORPHOLOGY
Observations on sacculles of rats exposed to long-term hypergravity A74-36468

MORTALITY
Oxygen effects on mortality of mice infected with Diplococcus pneumoniae A74-36471

MOTION SICKNESS
Relationship between susceptibility to motion sickness and tolerance to Coriolis forces A74-36656

MOTION SICKNESS DRUGS
Interactions, range effects, and comparisons between tasks in experiments measuring performance with pairs of stresses - Mild heat and 1 mg of L-hyoscyne hydrobromide A74-36472

MUSCLES
Studies on the detection of clinically silent involvement of muscle in lupus erythematosus [NASA-TT-F-15804] N74-28620

MUSCULAR STRENGTH
A servo-force balance isometric muscle force transducer A74-36224

N

NASA PROGRAMS
Some NASA contributions to human factors engineering: A survey [NASA-SP-5117] N74-28633

NERVOUS SYSTEM
Mathematical methods in the study of biological regulatory systems --- Russian book A74-36130
Reactions of the nervous system to magnetic fields N74-28606

NEURONS
Progress in vestibular modeling A74-35250

Phrenic motoneuron activity during thermal or hypocapnic polypnea A74-36364

Effect of cutting off the septal afferentia on acetylcholinesterase activity in the short-axon neurons of the hippocampus A74-36936

State of the neurosecretory nuclei of the hypothalamus after combined exposure to acceleration and ionizing radiation N74-28571

Reactions of spinal cord interneurons of delabyrinthectomized cats during oscillation N74-28593

NEUROPHYSIOLOGY
Mathematical methods in the study of biological regulatory systems --- Russian book A74-36130

NITROGEN
Diffusional and metabolic components of nitrogen elimination through the lungs A74-36211
Nitrogen metabolism in erythrocyte maturation; residual nitrogen formation and hemoglobin synthesis [NASA-TT-F-15741] N74-27548

NITROGEN DIOXIDE
The chronic effects of nitrogen dioxide --- on respiratory systems of mice [APTIC-40168] N74-27553

NOISE (SOUND)
Psychological factors related to the voluntary use of hearing protection in hazardous noise environments [AD-777520] N74-27579

NOISE INTENSITY
Level, peculiarities and effects of coal mine noise on pit workers --- correlation between noise intensity and hearing impairment N74-28390
Some aspects of sound discomfort caused by streetcar traffic --- noise intensity measurements and health aspects N74-28397

NOISE POLLUTION
Some aspects of sound discomfort caused by streetcar traffic --- noise intensity measurements and health aspects N74-28397
Guidelines for a training course in noise survey techniques [AD-776631] N74-28645

NOISE REDUCTION
Data on the acoustic comfort of passengers in railroad cars and soundproofing recommendations N74-28398

NYSTAGMUS
Quantitative effect of linear acceleration on positional alcohol nystagmus A74-36466
Peculiarities of the nystagmic reaction in human subjects after exposure to linear acceleration N74-28583

OBESITY
Hemodynamics in obesity: A brief review [NASA-TT-F-15826] N74-28562

OCCUPATION
Clinical problems and stress in air traffic control A74-35700
The pilot candidate's image of his profession A74-36999

OCULOGRAVIC ILLUSIONS
Tolerance to rotation with continuous and intermittent head movements [NASA-TT-F-15753] N74-27549

OCULOMOTOR NERVES
The consequences of degradations of the awake state on ocular positioning by saccadic movements A74-37007

OH-6 HELICOPTER
Pilot workload during instrument flight [AHS PREPRINT 820] A74-36624

ONBOARD EQUIPMENT

SUBJECT INDEX

ONBOARD EQUIPMENT

Development of integrated, zero-g pneumatic transporter/rotating paddle incinerator/catalytic afterburner subsystem for processing human wastes on board spacecraft [NASA-CR-114763] N74-27575

OPERATOR PERFORMANCE
Time-domain analysis of characteristics of the human operator in a simple manual control system A74-35991
The optimization of control gain by self-adjustment A74-36658
The human operator in a tracking task - Foresight and strategy A74-37009
Stress and the air traffic controller A74-37010
The development of an experimental human-operator sensory system A74-37011

OPTICAL ILLUSION
Evidence for the inhibition hypothesis in expanded angle illusion A74-37046

OPTICAL TRACKING
Display collimation under whole-body vibration A74-36755
The human operator in a tracking task - Foresight and strategy A74-37009

OPTIMAL CONTROL
The optimization of control gain by self-adjustment A74-36658

ORGAN WEIGHT
Effect of carbon monoxide on cardiac weight as compared with altitude effects A74-36218

ORTHOSTATIC TOLERANCE
Results of examination of the crew of the Salyut space station in a functional test with creation of negative pressure on the lower half of the body N74-28580
Study of the possibility of use of decompression of the lower body in diagnosis of body predisposition to a syncopal state --- for pilot selection N74-28581

OSCILLATIONS
Reactions of spinal cord interneurons of delabyrinthectomized cats during oscillation N74-28593

OTOLITH ORGANS
Observations on saccules of rats exposed to long-term hypergravity A74-36468

OXIDES
A comparison of the effects of SO₂, NO₂ and O₃ on the pulmonary ventilation: Guinea pig exposure experiments [APTIC-15680] N74-28559

OXYGEN
Tissue gases during hypovolemic shock A74-36221

OXYGEN BREATHING
Accumulation of quinones in the bodies of mice during hyperoxia N74-28574

OXYGEN CONSUMPTION
Oxygen deficit and debt in submaximal exercise at sea level and high altitude A74-36213
Body composition, sinking force, and oxygen uptake of man treading water A74-36215
A comparison of regional blood flow and oxygen utilization during dynamic forearm exercise in normal subjects and patients with congestive heart failure A74-36980

OXYGEN METABOLISM
Oxygen consumption by rats during prolonged breathing of an atmosphere with an increased carbon dioxide content N74-28591

OXYGEN PRODUCTION

Experiment with the incorporation of vegetable plants in a semiclosed life support system --- for oxygen and food production during manned space flight N74-28576

OXYGEN SUPPLY EQUIPMENT

Preliminary evaluation of portable aviation oxygen systems [AD-776348] N74-27581

OXYGEN TENSION

A micromixing method for determination of oxygen equilibria in blood A74-36222
A theoretical analysis of the relationship between venous blood and mean tissue oxygen pressures A74-37741

OXYHEMOGLOBIN

A micromixing method for determination of oxygen equilibria in blood A74-36222

OZONE

Ozone in aircraft cabins A74-36465
Studies on room ozonizers and on ozone occurrence in the outside air and in industrial plants [APTIC-07834] N74-27551

P

PANCREAS

Effect of restricted motor activity on the enzyme secretion function of the pancreas and extrasecretory function of the liver in rats --- body reaction to stress N74-28573

PARANASAL SINUSES

Expert evaluation of the state of the nasal sinuses in cosmonaut candidates --- medical diagnostic examinations for astronaut selections N74-28579

PASSENGERS

Experimental investigation of the influence of loads of variable sign on pilot efficiency and passenger comfort A74-36564
Data on the acoustic comfort of passengers in railroad cars and soundproofing recommendations N74-28398

Effect of motion frequency spectrum on subjective comfort response --- modeling passenger reactions to commercial aircraft flights [REPT-403212] N74-28630

PATHOLOGICAL EFFECTS

A study of the biological effect of continuous inhalation exposure of 1, 1, 1-trichloroethane (methyl chloroform) on animals [NASA-CR-134323] N74-27550
Concerning the effects of air pollution on the human organism in the Yokkaichi region [APTIC-47896] N74-27554
Hepatic pathology in mice after continuous inhalation exposure to 1, 1, 1-trichloroethane [NASA-CR-134322] N74-27556
Accumulation of quinones in the bodies of mice during hyperoxia N74-28574

PATTERN RECOGNITION

Detection of changes in spatial position. IV - Multiple display fields, display aiding, and interference A74-36751
Sight and mind: An introduction to visual perception --- Book A74-36771
Form-specific colour after effects in scotopic illumination A74-37047
Personality correlates of visual perceptual responses A74-37374
Studies on visual pattern recognition in man and animals A74-37910

PERIPHERAL CIRCULATION

Studies of peripheral circulatory rhythms in resting and exercising humans A74-36228

SUBJECT INDEX

PILOT SELECTION

- Reaction of the resistive and capacitive vessels of the hand at the start of muscular exercise
A74-36360
- PERIPHERAL NERVOUS SYSTEM**
Some observations on the homogeneity of response of single chemoreceptor fibres --- in cat carotid sinus nerve
A74-37740
- PERIPHERAL VISION**
Peripheral visual response time and visual display layout
A74-35564
A measurement of the anisotropic modulation transfer function of the extrafoveal human visual system [AD-777853]
N74-28624
- PERMEABILITY**
Effects of vitamins on the penetration of lipoate-S sup 35 into the cells of animals subjected to acceleration
N74-28589
- PERSONALITY TESTS**
Psychotherapy for aircrew members
A74-36996
Personality correlates of visual perceptual responses
A74-37374
- PERSONNEL SELECTION**
Problems in the selection of personnel operators for closed ecologic systems and prophylactic measures for neuropsychic disorders --- effects of social isolation [AD-777684]
N74-27583
- PERMOOLS**
Fine structure of tannin accumulations in callus cultures of Pinus elliotti /slash pine/
A74-36195
- PHYSICAL EXERCISE**
Oxygen deficit and debt in submaximal exercise at sea level and high altitude
A74-36213
Body composition, sinking force, and oxygen uptake of man treading water
A74-36215
Studies of peripheral circulatory rhythms in resting and exercising humans
A74-36228
Reaction of the resistive and capacitive vessels of the hand at the start of muscular exercise
A74-36360
A comparison of regional blood flow and oxygen utilization during dynamic forearm exercise in normal subjects and patients with congestive heart failure
A74-36980
- PHYSIOLOGICAL FACTORS**
The generalization function in monkeys - Physiological aspect
A74-37325
- PHYSIOLOGICAL RESPONSES**
Brain catechol synthesis - Control by brain tyrosine concentration
A74-35335
Regional vascular changes after functional loading
A74-35525
Effect of high ambient pressure on human apneic bradycardia
A74-36220
Studies of peripheral circulatory rhythms in resting and exercising humans
A74-36228
Changes in the plasma electrolyte levels of the rabbits during acute exposure to simulated high altitude
A74-36652
Effects of acute exposure to hypobaric hypoxia on water contents in the blood and several tissues in the rat
A74-36654
Relationship between susceptibility to motion sickness and tolerance to Coriolis forces
A74-36656
The effect of stochastic /mechanical/ vibrations on physiological and psychological functions and on subjective perception
A74-37075
Eye-movements and visual perception --- Book
A74-37093
- Doctor in space --- Skylab crew medical experiences
A74-38027
The effect of three day hypodynamia on liver function [NASA-TT-F-15646]
N74-28566
Electromagnetic power deposition in man exposed to high-frequency fields and the associated thermal and physiologic consequences [AD-776821]
N74-28627
- PHYSIOLOGICAL TESTS**
Physiological adjustments to environmental factors [AD-777290]
N74-27564
- PILOT ERROR**
Consideration of investigation on reading error of aircraft instruments
A74-36653
Pilot factor in aircraft accidents of the German Federal Armed Forces
A74-37004
- PILOT PERFORMANCE**
Effect of the psychophysiological properties of a pilot on the choice of the dynamic characteristics of an aircraft
A74-36506
Experimental investigation of the influence of loads of variable sign on pilot efficiency and passenger comfort
A74-36564
Helicopter flight investigation to determine the effects of a closed-circuit TV on performance of a precision sling-load handling task [AHS PREPRINT 862]
A74-36602
Pilot workload during instrument flight [AHS PREPRINT 820]
A74-36624
The analysis of aviation training evaluations. I - Effects of flying hours upon training evaluations
A74-36655
Display collimation under whole-body vibration
A74-36755
Research in aviation psychology; European Congress on Aviation Psychology, 10th, Paris, France, September 11-15, 1973, Transactions
A74-36995
Effects of domestic stress upon flying proficiency
A74-36997
Adjustment and maladjustment in elementary pilot training
A74-36998
The pilot candidate's image of his profession
A74-36999
Women commercial pilots
A74-37001
Study of relations among the behavioral patterns, sociometric indices, and performance in pilot training at a commercial aviation school
A74-37002
Experimental study of a specific projective test for the evaluation of adjustment to the aviation environment
A74-37003
Pilot factor in aircraft accidents of the German Federal Armed Forces
A74-37004
The role of man in system safety
A74-37006
The consequences of degradations of the awake state on ocular positioning by saccadic movements
A74-37007
Prediction of acceleration tolerance by means of a decompression functioning test
A74-37532
The effects of sustained acceleration, airframe buffet, and aircraft flying qualities on tracking performance [AIAA PAPER 74-793]
A74-37813
Study of control force limits for female pilots [AD-777839]
N74-27585
Changes in the diurnal variations of simulated pilot activity after time shift due to air travel through several time zones [ESRO-TT-49]
N74-28622
- PILOT SELECTION**
Present notions on the psychological selection of aircrews
A74-37000
Achievement motivation in pilots-selection
A74-37005

PILOT TRAINING

Expert evaluation of the state of the nasal sinuses in cosmonaut candidates --- medical diagnostic examinations for astronaut selections N74-28579

PILOT TRAINING
Proposed spatial orientation flight training concept --- using ground based vestibular simulators A74-36477

The analysis of aviation training evaluations. I - Effects of flying hours upon training evaluations A74-36655

Adjustment and maladjustment in elementary pilot training A74-36998

Study of relations among the behavioral patterns, sociometric indices, and performance in pilot training at a commercial aviation school A74-37002

PITUITARY HORMONES
Effect of heat on growth hormone secretion and adrenal cortex activity in rats A74-36363

PLANETARY QUARANTINE
Scientific publications and presentations relating to planetary quarantine. Volume 5: The 1973 supplement --- bibliography [NASA-CR-138898] N74-28554

PLANTS (BOTANY)
Fine structure of tannin accumulations in callus cultures of *Pinus elliotti* /slash pine/ A74-36195

Peculiarities of the chemical composition of green plants during their prolonged cultivation on an ionite substrate N74-28577

PLETHYSMOGRAPHY
Reaction of the resistive and capacitive vessels of the hand at the start of muscular exercise A74-36360

PNEUMATIC EQUIPMENT
Development of integrated, zero-g pneumatic transporter/rotating paddle incinerator/catalytic afterburner subsystem for processing human wastes on board spacecraft [NASA-CR-114763] N74-27575

POISONS
A comparison of the effects of SO₂, NO₂ and O₃ on the pulmonary ventilation: Guinea pig exposure experiments [APTIC-15680] N74-28559

POLARIZED LIGHT
Haidinger's brushes and predominant orientation of collagen in corneal stroma A74-36421

PORTABLE EQUIPMENT
Preliminary evaluation of portable aviation oxygen systems [AD-776348] N74-27581

PRESSURE BREATHING
Effect of high ambient pressure on human apneic bradycardia A74-36220

Spirographic investigation of the ventilatory lung function under hyperbaric conditions A74-36400

PRESSURE REDUCTION
Prediction of acceleration tolerance by means of a decompression functioning test A74-37532

Study of the possibility of use of decompression of the lower body in diagnosis of body predisposition to a syncopal state --- for pilot selection N74-28581

PRESSURE SUITS
G suit filling pressures determined by seat back angle A74-36476

Physiologic responses to high sustained plusGz acceleration --- pressure suit for increased human tolerance [AD-777604] N74-27559

PRIMATES
The generalization function in monkeys - Physiological aspect A74-37325

SUBJECT INDEX

PROPHYLAXIS
Problems in the selection of personnel operators for closed ecologic systems and prophylactic measures for neuropsychic disorders --- effects of social isolation [AD-777684] N74-27583

Effectiveness of administration of amytetravite and ATP during prolonged irradiation --- effectiveness of prophylactic antiradiation drugs N74-28570

The protective effect of a constant magnetic field --- reduction of molecular cell pathology N74-28615

PROPRIOCEPTION
Proposed spatial orientation flight training concept --- using ground based vestibular simulators A74-36477

PROPULSIVE EFFICIENCY
Energetics of swimming in man A74-36208

PROTECTIVE CLOTHING
Objective approach to a design of a whole-body, water-cooled suit A74-36469

PROTEIN METABOLISM
Proteolytic enzymes and protein metabolism in rabbit erythrocytes during cell maturation in vivo [NASA-TM-X-15731] N74-27555

Investigation of assimilability of amino acids by man receiving an amino acid mixture --- replacement of protein component in diet N74-28586

PSYCHOACOUSTICS
Some aspects of sound discomfort caused by streetcar traffic --- noise intensity measurements and health aspects N74-28397

PSYCHOLOGICAL EFFECTS
The effect of stochastic /mechanical/ vibrations on physiological and psychological functions and on subjective perception A74-37075

PSYCHOLOGICAL FACTORS
Research in aviation psychology; European Congress on Aviation Psychology, 10th, Paris, France, September 11-15, 1973, Transactions A74-36995

Present notions on the psychological selection of aircrews A74-37000

Women commercial pilots A74-37001

The role of man in system safety A74-37006

Personality correlates of visual perceptual responses A74-37374

Psychological factors related to the voluntary use of hearing protection in hazardous noise environments [AD-777520] N74-27579

PSYCHOLOGICAL TESTS
Experimental study of a specific projective test for the evaluation of adjustment to the aviation environment A74-37003

Achievement motivation in pilots-selection A74-37005

Validation of two aircrew psychomotor tests [AD-777830] N74-28642

PSYCHOMETRICS
Effects of domestic stress upon flying proficiency A74-36997

Experimental study of a specific projective test for the evaluation of adjustment to the aviation environment A74-37003

PSYCHOMOTOR PERFORMANCE
Response-produced timeouts under a progressive-ratio schedule with a punished reset option A74-35988

Interactions, range effects, and comparisons between tasks in experiments measuring performance with pairs of stressors - Mild heat and 1 mg of L-hyosine hydrobromide A74-36472

Validation of two aircrew psychomotor tests [AD-777830] N74-28642

PSYCHOPHYSICS

A measurement of the anisotropic modulation transfer function of the extrafoveal human visual system
[AD-777853] N74-28624

PSYCHOPHYSIOLOGY

Effect of the psychophysiological properties of a pilot on the choice of the dynamic characteristics of an aircraft N74-36506
Sight and mind: An introduction to visual perception --- Book N74-36771
Human binocular summation at absolute threshold N74-37907

PSYCHOSOMATICS

Adjustment and maladjustment in elementary pilot training N74-36998

PSYCHOTHERAPY

Psychotherapy for aircrew members N74-36996

PULMONARY FUNCTIONS

Cardiopulmonary function in prospective competitive swimmers and their parents N74-36210
Diffusional and metabolic components of nitrogen elimination through the lungs N74-36211
Spirographic investigation of the ventilatory lung function under hyperbaric conditions N74-36400

PULSE DURATION

Ocular hazard from picosecond pulses of Nd:YAG laser radiation N74-36414

PULSE RATE

Cardiac rhythm computer analysis techniques [NASA-TT-F-15733] N74-27574

PULSED LASERS

Ocular hazard from picosecond pulses of Nd:YAG laser radiation N74-36414

R

RABBITS

To what extent is the glycolysis in mammalian erythrocytes carried out via 2,3 diphosphoglyceric acid? About a variant of the glycolytic cycle on the level of phosphoglyceric acids [RAE-LIB-TRANS-1724] N74-27545
Effect of a magnetic field of extremely low intensity on the coagulatory system of the blood N74-28607
The influence of a constant magnetic field on the coagulatory system of the blood in an experiment N74-28608
Repeated action of a constant magnetic field on the blood coagulation system in artificially produced anemia N74-28609

RADIATION ABSORPTION

Experimental data on the influence of irradiation of food products by protons and gamma radiation --- considering radiation absorption by astronauts N74-28569
Ultraviolet fluorescence of myeloid cells in the bone marrow of dogs exposed to chronic radiation N74-28588

RADIATION DOSAGE

Study of blood forming organ dose as a function of proton environment [NASA-CR-132475] N74-28561
Dosimetric investigations aboard the Salyut orbital space station --- cosmic radiation measurements N74-28568

RADIATION EFFECTS

Thermal tolerance of blood serum in dogs subjected to combined exposure to X-radiation and reduced barometric pressure N74-28594
Electromagnetic power deposition in man exposed to high-frequency fields and the associated thermal and physiologic consequences [AD-776821] N74-28627

RADIATION INJURIES

Ocular hazard from picosecond pulses of Nd:YAG laser radiation N74-36414
Effectiveness of administration of amytetravite and ATP during prolonged irradiation --- effectiveness of prophylactic antiradiation drugs N74-28570
Ocular damage thresholds for repetitive pulsed argon laser exposure [AD-777144] N74-28625

RADIATION TOLERANCE

State of the neurosecretory nuclei of the hypothalamus after combined exposure to acceleration and ionizing radiation N74-28571
Influence of functional loads on the state of the phagocytic function of blood in dogs subjected to chronic gamma-irradiation --- physiological defense mechanisms to irradiation N74-28592

RADICALS

Accumulation of quinones in the bodies of mice during hyperoxia N74-28574

RADIOACTIVE ISOTOPES

G-189A analytical simulation of the integrated waste management-water system using radioisotopes for thermal energy [NASA-CR-120251] N74-28629

RADIOBIOLOGY

Space biology and aerospace medicine, volume 8, no. 3, 1974 [JPRS-62553] N74-28567

RADIOPATHOLOGY

Influence of functional loads on the state of the phagocytic function of blood in dogs subjected to chronic gamma-irradiation --- physiological defense mechanisms to irradiation N74-28592

RAIL TRANSPORTATION

Data on the acoustic comfort of passengers in railroad cars and soundproofing recommendations N74-28398

RANDOM VIBRATION

The effect of stochastic /mechanical/ vibrations on physiological and psychological functions and on subjective perception N74-37075

RAPID EYE MOVEMENT STATE

Effect of imipramine, nitrazepam and sodium hydroxybutyrate on sleep impairments caused by emotional stress N74-28575

RATS

Effects of acute exposure to hypobaric hypoxia on water contents in the blood and several tissues in the rat N74-36654

REACTION TIME

Peripheral visual response time and visual display layout N74-35564

READING

A dynamic test method for investigations of electronic displays --- noting readability N74-28636

RECEPTORS (PHYSIOLOGY)

Fibers projecting onto the Crista ampullaris of the vertical anterior semicircular canal from other ipsilateral vestibular receptors in the frog /Rana esculenta/ N74-36324

REINFORCEMENT (PSYCHOLOGY)

Response-produced timeouts under a progressive-ratio schedule with a punished reset option N74-35988

REMOTE HANDLING

Study to design and develop remote manipulator system --- computer simulation of human performance [NASA-CR-137528] N74-27571

RENAL FUNCTION

Renal parameter estimates in unrestrained dogs N74-37911

RESCUE OPERATIONS

SUBJECT INDEX

RESCUE OPERATIONS
 Development of a litter access device for C-141
 aeromedical aircraft
 [AD-777147] N74-27578

RESPIRATION
 Effect of inspiratory flow rate on regional
 distribution of inspired gas A74-36209
 Respiratory heat loss at increased core temperature
 A74-36219

RESPIRATORY DISEASES
 Characteristics of the immunological state of man
 during hypoxic hypoxia N74-28582

RESPIRATORY IMPEDANCE
 Expert evaluation of the state of the nasal
 sinuses in cosmonaut candidates --- medical
 diagnostic examinations for astronaut selections
 N74-28579

RESPIRATORY PHYSIOLOGY
 Body composition, sinking force, and oxygen uptake
 of man treading water A74-36215
 Variability of maximum expiratory flow-volume curves
 A74-36216
 Effect of high ambient pressure on human apneic
 bradycardia A74-36220
 Influence of hypoxia on tidal volume response to
 CO2 in decerebrate cats A74-37739
 Some observations on the homogeneity of response
 of single chemoreceptor fibres --- in cat
 carotid sinus nerve A74-37740
 Evidence of altered regulation of ventilation
 during exposure to hypoxia A74-37742

RESPIRATORY RATE
 Hemodynamic and respiratory responses compared in
 swimming and running A74-36214
 Study of the ventilation function during thermal
 or hypocapnic polypnea A74-36361
 Phrenic motoneuron activity during thermal or
 hypocapnic polypnea A74-36364
 A comparison of the effects of SO2, NO2 and O3 on
 the pulmonary ventilation: Guinea pig exposure
 experiments [APTIC-15680] N74-28559
 Oxygen consumption by rats during prolonged
 breathing of an atmosphere with an increased
 carbon dioxide content N74-28591
 Results of telemetric stress measurements of
 pulse-and respiratory frequency on the VJ 101 C
 - X 2, and a proposal for the use of a
 standardized evaluation program for the future
 treatment of such investigations N74-28640

RESPIRATORY REFLEXES
 The influence of dehydration on heat dissipation
 mechanisms in the rabbit A74-36358

RESPIRATORY SYSTEM
 The chronic effects of nitrogen dioxide --- on
 respiratory systems of mice [APTIC-40168] N74-27553
 A two compartmental model of the respiratory system
 [PB-228669/8] N74-27565

RESPONSES
 Peripheral visual response time to colored stimuli
 imaged on the horizontal meridian [NASA-TN-X-3086] N74-27557

REST
 Studies of peripheral circulatory rhythms in
 resting and exercising humans A74-36228

RETINAL ADAPTATION
 Form-specific colour after effects in scotopic
 illumination A74-37047

RETINAL IMAGES
 Eye-movements and visual perception --- Book
 A74-37093
 Human binocular summation at absolute threshold
 A74-37907

RHYTHM (BIOLOGY)
 Glossary of selected chronobiologic terms A74-36229

ROOMS
 Studies on room ozonizers and on ozone occurrence
 in the outside air and in industrial plants
 [APTIC-07834] N74-27551

ROTATING ENVIRONMENTS
 Fibers projecting onto the Crista ampullaris of
 the vertical anterior semicircular canal from
 other ipsilateral vestibular receptors in the
 frog /Rana esculenta/ A74-36324

ROTATION
 Kinematic characteristics of motion of the human
 head in different planes N74-28587

RUNNING
 Hemodynamic and respiratory responses compared in
 swimming and running A74-36214
 Heart rate and energy-yielding substrates in blood
 during long-lasting running A74-36398

S

SACCADIC EYE MOVEMENTS
 The consequences of degradations of the awake
 state on ocular positioning by saccadic movements
 A74-37007
 Uncertainty sets associated with saccadic eye
 movements - Basis of satisfaction control
 A74-37908

SAFETY DEVICES
 Air bag restraint systems --- for motor vehicle
 operators [PB-227749/9] N74-27584

SAFETY FACTORS
 Lythgoe's visual stereophenomenon in the natural
 environment - A possible factor in air and
 highway accidents A74-36753

SALYUT SPACE STATION
 Dosimetric investigations aboard the Salyut
 orbital space station --- cosmic radiation
 measurements N74-28568
 Results of examination of the crew of the Salyut
 space station in a functional test with creation
 of negative pressure on the lower half of the body
 N74-28580

SARCINA
 Long term effect on high vacuum on microorganisms
 [NASA-TT-F-15720] N74-28564

SCALING
 Step size in the Munsell color order system
 N74-27567

SEATS
 G suit filling pressures determined by seat back
 angle A74-36476
 A model for the response of seated humans to
 sinusoidal displacements of the seat A74-37924

SELF ALIGNMENT
 The optimization of control gain by self-adjustment
 A74-36658

SEMICIRCULAR CANALS
 Progress in vestibular modeling A74-35250
 Fibers projecting onto the Crista ampullaris of
 the vertical anterior semicircular canal from
 other ipsilateral vestibular receptors in the
 frog /Rana esculenta/ A74-36324

SENSORIMOTOR PERFORMANCE
 Lythgoe's visual stereophenomenon in the natural
 environment - A possible factor in air and
 highway accidents A74-36753
 Study to design and develop remote manipulator
 system --- computer simulation of human
 performance [NASA-CR-137528] N74-27571

SENSORY DEPRIVATION
 Isolation and sensory communication --- adjustment
 to stress [AD-777156] N74-27577

SENSORY PERCEPTION

The effect of stochastic /mechanical/ vibrations on physiological and psychological functions and on subjective perception

A74-37075

SEPTUM

Effect of cutting off the septal afferents on acetylcholinesterase activity in the short-axon neurons of the hippocampus

A74-36936

SEROTONIN

Brain catechol synthesis - Control by brain tyrosine concentration

A74-35335

SERUMS

Thermal tolerance of blood serum in dogs subjected to combined exposure to X-radiation and reduced barometric pressure

N74-28594

SERVOMECHANISMS

A servo-force balance isometric muscle force transducer

A74-36224

SHOCK LOADS

Parameters for the description of shock effects and shock tolerance limits

A74-36687

Human tolerance to shock - Evaluation criteria and limiting values

A74-36688

SHOCK MEASURING INSTRUMENTS

The shock test, its problems at the present time and in the future

A74-36689

SHOCK SPECTRA

The shock test, its problems at the present time and in the future

A74-36689

SHOCK TESTS

Vibrational technology: Criteria for shock effects and shock tolerance; Colloquium, Technische Hochschule Darmstadt, Darmstadt, West Germany, April 9, 10, 1973, Reports

A74-36682

Shock tests with dummies and their evaluation

A74-36686

Parameters for the description of shock effects and shock tolerance limits

A74-36687

The shock test, its problems at the present time and in the future

A74-36689

SIGNAL ANALYSIS

Investigation methods for manual control processes

A74-36659

SIGNAL DETECTION

Effects of background event rate and critical signal amplitude on vigilance performance

A74-37373

Vertex evoked potentials in a rating-scale detection task: Relation to signal probability [NASA-CR-138796]

N74-27573

SIGNAL PROCESSING

The human operator in a tracking task - Foresight and strategy

A74-37009

SIGNS AND SYMPTOMS

Acute lupus erythematosus with complete deficiency of the C4 fraction of complement [NASA-TT-F-15727]

N74-28563

SITTING POSITION

G suit filling pressures determined by seat back angle

A74-36476

A model for the response of seated humans to sinusoidal displacements of the seat

A74-37924

SIZE DETERMINATION

An improved method for echographic detection of left atrial enlargement

A74-36975

Perception of size at the detection threshold - Its accuracy and possible mechanisms

A74-37909

SKIN (ANATOMY)

Acute lupus erythematosus with complete deficiency of the C4 fraction of complement [NASA-TT-F-15727]

N74-28563

Studies on the detection of clinically silent involvement of muscle in lupus erythematosus [NASA-TT-F-15804]

N74-28620

SKYLAB PROGRAM

All-exotic materials used in NASA's Skylab/Space Shuttle crews' bump protective helmets

A74-35839

Doctor in space --- Skylab crew medical experiences

A74-38027

SLEEP

Regularity in the control of the free-running sleep-wakefulness rhythm

A74-36467

Detection of the K-complex in human EEG sleep records

N74-27560

Effect of isiparamine, nitrazepam and sodium hydroxybutyrate on sleep impairments caused by emotional stress

N74-28575

SOCIAL FACTORS

Study of relations among the behavioral patterns, sociometric indices, and performance in pilot training at a commercial aviation school

A74-37002

Psychopharmacological regulation of interpersonality relationships in a group (experimental investigation)

N74-28578

SOCIAL PSYCHIATRY

Effects of domestic stress upon flying proficiency

A74-36997

SOLAR ACTIVITY EFFECTS

Studies in Geomagnetism, aeronomy and solar physics (problems of heliobiology and the biological effect of magnetic fields)

N74-28596

Heliobiology, its development, successes and tasks --- solar activity effects on life on earth

N74-28597

Notes on the concept of normal values employed in clinical practice --- statistical correlation with environment effects

N74-28598

Influence of solar activity on fibrinolysis and fibrinogenolysis --- statistical correlation between solar flare and blood coagulation indices

N74-28599

Fibrinolysis and fibrinogenolysis on magnetically-active days --- statistical correlation to magnetic storms

N74-28600

Results of comparison of the dynamics of the epidemic process with changes in the planetary index of magnetic disturbance --- statistical correlation to solar activities

N74-28603

The problem of the periodicity of the epidemic process --- solar activity effects on diphtheria outbreak

N74-28604

Statistical evaluation of the significance of the influence of abrupt changes in solar activity on the dynamics of the epidemic process

N74-28605

SONIC BOOMS

Effects of sonic boom on automobile-driver behaviour [UTIAS-TN-188]

N74-27576

SPACE ENVIRONMENT SIMULATION

Investigation of the state of human lipid metabolism in sealed chambers

N74-28585

SPACE MANUFACTURING

Transphoresis and isotachophoresis as preparative techniques with reference to zero-gravity [ATAA PAPER 74-664]

A74-35911

SPACE PERCEPTION

Proposed spatial orientation flight training concept --- using ground based vestibular simulators

A74-36477

Detection of changes in spatial position. IV - Multiple display fields, display aiding, and interference

A74-36751

Sight and mind: An introduction to visual perception --- Book

A74-36771

SPACE SHUTTLES

SPACE SHUTTLES

All-exotic materials used in NASA's Skylab/Space Shuttle crews' bump protective helmets

A74-35839

SPACECREWS

Doctor in space --- Skylab crew medical experiences

A74-38027

Results of examination of the crew of the Salyut space station in a functional test with creation of negative pressure on the lower half of the body

N74-28580

SPINAL CORD

Reactions of spinal cord interneurons of delabyrinthectomized cats during oscillation

N74-28593

SPINE

A mechanical model of the human ligamentous spine and its application to the pilot ejection problem

N74-28556

STANDARDS

Notes on the concept of normal values employed in clinical practice --- statistical correlation with environment effects

N74-28598

STATISTICAL ANALYSIS

Time-domain analysis of characteristics of the human operator in a simple manual control system

A74-35991

Investigation methods for manual control processes

A74-36659

STATISTICAL CORRELATION

Studies in Geomagnetism, aeronomy and solar physics (problems of heliobiology and the biological effect of magnetic fields)

[NASA-TT-F-15862] N74-28596

The problem of the periodicity of the epidemic process --- solar activity effects on diphtheria outbreak

N74-28604

Statistical evaluation of the significance of the influence of abrupt changes in solar activity on the dynamics of the epidemic process

N74-28605

STEREOSCOPIC VISION

Lythgoe's visual stereophenomenon in the natural environment - A possible factor in air and highway accidents

A74-36753

Sight and mind: An introduction to visual perception --- Book

A74-36771

STRESS (PHYSIOLOGY)

Clinical problems and stress in air traffic control

A74-35700

Respiratory heat loss at increased core temperature

A74-36219

Blood sugar levels in rats exposed to varying altitude stress for different periods of time

A74-36470

Interactions, range effects, and comparisons between tasks in experiments measuring performance with pairs of stresses - Mild heat and 1 mg of L-hyoscyne hydrobromide

A74-36472

Shock tests with dummies and their evaluation

A74-36686

The development of an experimental human-operator sensory system

A74-37011

Physiological adjustments to environmental factors [AD-777290]

N74-27561

Results of telemetric stress measurements of pulse-and respiratory frequency on the VJ 101 C - X 2, and a proposal for the use of a standardized evaluation program for the future treatment of such investigations

N74-28640

STRESS (PSYCHOLOGY)

Effects of domestic stress upon flying proficiency

A74-36997

Stress and the air traffic controller

A74-37010

Isolation and sensory communication --- adjustment to stress

[AD-777156] N74-27577

Effect of imipramine, nitrazepam and sodium hydroxybutyrate on sleep impairments caused by emotional stress

N74-28575

SUBJECT INDEX

SUPINE POSITION

Impedance measurements for the development of a nonlinear model of supine man

A74-36685

SURVEYS

The pilot candidate's image of his profession

A74-36999

Reactions of the nervous system to magnetic fields

N74-28606

Some NASA contributions to human factors engineering: A survey [NASA-SP-5117]

N74-28633

SWIMMING

Energetics of swimming in man

A74-36208

Cardiopulmonary function in prospective competitive swimmers and their parents

A74-36210

Hemodynamic and respiratory responses compared in swimming and running

A74-36214

Body composition, sinking force, and oxygen uptake of man treading water

A74-36215

SWINE

Hematological studies after rapid decompression [ESRO-TT-61]

N74-28623

SYSTEMS ANALYSIS

Investigation methods for manual control processes

A74-36659

SYSTEMS ENGINEERING

Design and fabricate a pair of Rancho anthropomorphic manipulator arms [NASA-CR-120275]

N74-27568

SYSTOLE

The variable spectrum of echocardiographic manifestations of the mitral valve prolapse syndrome

A74-36973

T

TARGET ACQUISITION

Effects of aircraft altitude and speed on air-to-ground visual target acquisition

A74-36474

Uncertainty sets associated with saccadic eye movements - Basis of satisfaction control

A74-37908

TARGET RECOGNITION

Experimental evaluation of an airborne illumination system

A74-36754

The effects of sustained acceleration, airframe buffet, and aircraft flying qualities on tracking performance [AIAA PAPER 74-793]

A74-37813

TASK COMPLEXITY

Comparative investigations of the learning process in tracking tests of constant or quasi-constant and self-adapting difficulty level. I - Middle learning level - Reliability - Antagonism learning/fatigue. II - Differential diagnostic parameters - Relevant or irrelevant additional signals

A74-36399

Sequential task performance - Task module relationships, reliabilities, and times

A74-36752

TECHNOLOGY TRANSFER

Some NASA contributions to human factors engineering: A survey [NASA-SP-5117]

N74-28633

TELEMETRY

Results of telemetric stress measurements of pulse-and respiratory frequency on the VJ 101 C - X 2, and a proposal for the use of a standardized evaluation program for the future treatment of such investigations

N74-28640

TELEVISION SYSTEMS

A television method for measuring capillary red cell velocities

A74-36223

TEMPERATURE EFFECTS

The influence of dehydration on heat dissipation mechanisms in the rabbit

A74-36358

- Effect of heat on growth hormone secretion and adrenal cortex activity in rats A74-36363
- TERRAIN FOLLOWING AIRCRAFT**
Effect of nap-of-the-earth requirements on aircrew performance during night attack helicopter operations [AHS PREPRINT 863] A74-36603
- TEST CHAMBERS**
Investigation of the state of human lipid metabolism in sealed chambers N74-28585
- THERAPY**
Effect of magnetic bracelets on the coagulation and anticoagulation systems of the blood of patients with hypertension N74-28618
Treatment of the external epicondylitis of the humerus with a magnetic field N74-28619
- THERMAL PROTECTION**
Objective approach to a design of a whole-body, water-cooled suit A74-36469
- THERMODYNAMIC EQUILIBRIUM**
Atmospheric homeostasis by and for the biosphere - The Gaia hypothesis A74-35521
Thermodynamics and the origin of life --- emphasizing free energy A74-37437
- THERMOREGULATION**
The influence of dehydration on heat dissipation mechanisms in the rabbit A74-36358
Study of the ventilation function during thermal or hypocapnic polypnea A74-36361
Determination of the zone of thermal neutrality in water [RAE-LIB-TRANS-1704] N74-27546
- THRESHOLDS**
Ocular damage thresholds for repetitive pulsed argon laser exposure [AD-777144] N74-28625
- THRESHOLDS (PERCEPTION)**
Ocular hazard from picosecond pulses of Nd:YAG laser radiation A74-36414
Hearing threshold sensitivity in airline pilots A74-36478
Human binocular summation at absolute threshold A74-37907
Perception of size at the detection threshold - Its accuracy and possible mechanisms A74-37909
A review of selected bioeffects thresholds for various spectral ranges of light [PB-228391/9] N74-27563
- THROMBIN**
Influence of solar activity on fibrinolysis and fibrinogenolysis --- statistical correlation between solar flare and blood coagulation indices N74-28599
Influence of synaptic processes on fibrinolysis and fibrinogenolysis in healthy persons --- meteorological effects on blood coagulation N74-28601
The influence of weather on fibrinolysis and fibrinogenolysis --- in human body N74-28602
Changes in the fibrinogen-fibrin system following a 20-hour exposure of rabbits to a magnetic field N74-28617
- THROMBOCYTES**
Influence of a constant magnetic field on thrombocytes --- delay of blood coagulation time N74-28614
- THYROID GLAND**
Effect of thyrocalcitonin on water-mineral metabolism in rabbits during prolonged restriction of mobility N74-28572
- TIME DEPENDENCE**
Microbial detection method based on sensing molecular hydrogen A74-36374
- TIME RESPONSE**
Response-produced timeouts under a progressive-ratio schedule with a punished reset option A74-35988
Sequential task performance - Task module relationships, reliabilities, and times A74-36752
Thermodynamics and the origin of life --- emphasizing free energy A74-37437
- TISSUES (BIOLOGY)**
Fine structure of tannin accumulations in callus cultures of *Pinus elliotti* /slash pine/ A74-36195
Tissue gases during hypovolemic shock A74-36221
Effects of acute exposure to hypobaric hypoxia on water contents in the blood and several tissues in the rat A74-36654
A theoretical analysis of the relationship between venous blood and mean tissue oxygen pressures A74-37741
Hypoxia and tissue gas exchange [AD-777158] N74-27558
- TOXICITY**
The chronic effects of nitrogen dioxide --- on respiratory systems of mice [APTIC-40168] N74-27553
- TOXICITY AND SAFETY HAZARD**
Studies on room ozonizers and on ozone occurrence in the outside air and in industrial plants [APTIC-07834] N74-27551
- TRACHEA**
Evaluation of intratracheal cuffs for aeromedical evacuation [AD-776319] N74-28646
- TRACKING (POSITION)**
Comparative investigations of the learning process in tracking tests of constant or quasi-constant and self-adapting difficulty level. I - Middle learning level - Reliability - Antagonism learning/fatigue. II - Differential diagnostic parameters - Relevant or irrelevant additional signals A74-36399
- TRANSDUCERS**
A servo-force balance isometric muscle force transducer A74-36224
Arterial pulse wave pressure transducer [NASA-CASE-GSC-11531-1] N74-27566
- TRANSFER FUNCTIONS**
A measurement of the anisotropic modulation transfer function of the extrafoveal human visual system [AD-777853] N74-28624
- TRANSFER OF TRAINING**
Transfer of training from predictor to conventional displays [AD-777171] N74-28644
Transfer from audiovisual pretraining to a continuous perceptual motor task [AD-778078] N74-28647
- TRANSPORT VEHICLES**
Some aspects of sound discomfort caused by streetcar traffic --- noise intensity measurements and health aspects N74-28397
- U
- ULTRASONIC TESTS**
Multiple crystal echocardiographic evaluation of endocardial cushion defect A74-36972
- URINE**
Influence of bedrest and hypercapnia upon urinary mineral excretion in man A74-36475
Development testing of a shuttle urine collection system [NASA-CR-134337] N74-27572
Vacuum distillation/vapor filtration water recovery [NASA-CR-120303] N74-28632

USER MANUALS (COMPUTER PROGRAMS)

SUBJECT INDEX

USER MANUALS (COMPUTER PROGRAMS)

User's manual for UCIN vehicle-occupant
crash-study model
[AD-778338] N74-28648

V

VACUUM SYSTEMS

Vacuum distillation/vapor filtration water recovery
[NASA-CR-120303] N74-28632

VAPORIZING

Vacuum distillation/vapor filtration water recovery
[NASA-CR-120303] N74-28632

VASCULAR SYSTEM

Regional vascular changes after functional loading
A74-35525

VEGETABLES

Experiment with the incorporation of vegetable
plants in a semiclosed life support system ---
for oxygen and food production during manned
space flight
N74-28576

VEHICLES

User's manual for UCIN vehicle-occupant
crash-study model
[AD-778338] N74-28648

VEINS

A theoretical analysis of the relationship between
venous blood and mean tissue oxygen pressures
A74-37741

VELOCITY DISTRIBUTION

Parameters for the description of shock effects
and shock tolerance limits
A74-36687

VELOCITY MEASUREMENT

A television method for measuring capillary red
cell velocities
A74-36223

VESTIBULAR TESTS

Progress in vestibular modeling
A74-35250
Proposed spatial orientation flight training concept
--- using ground based vestibular simulators
A74-36477
Tolerance to rotation with continuous and
intermittent head movements
[NASA-TT-F-15753] N74-27549

VESTIBULES

Fibers projecting onto the Crista ampullaris of
the vertical anterior semicircular canal from
other ipsilateral vestibular receptors in the
frog /Rana esculenta/
A74-36324

VIBRATION EFFECTS

Vibrational technology: Criteria for shock effects
and shock tolerance; Colloquium, Technische
Hochschule Darmstadt, Darmstadt, West Germany,
April 9, 10, 1973, Reports
A74-36682
Display collimation under whole-body vibration
A74-36755
The effect of stochastic /mechanical/ vibrations
on physiological and psychological functions and
on subjective perception
A74-37075

VIBRATION SIMULATORS

The shock test, its problems at the present time
and in the future
A74-36689

VIBRATION TESTS

Contribution to the optimization of the
oscillatory properties of a vehicle:
Physiological foundations of comfort during
oscillations
[RAE-LIB-TRANS-1707] N74-27569

VIRUSES

Acute lupus erythematosus with complete deficiency
of the C4 fraction of complement
[NASA-TT-F-15727] N74-28563
Human cytomegalovirus (CMV) and indirect
immunofluorescence in disseminated Lupus
erythematosus
[NASA-TT-F-15712] N74-28565

VISUAL ACUITY

Effects of hypoxia on peripheral visual response
to rapid sustained stimulation
A74-36217

VISUAL DISCRIMINATION

Detection of changes in spatial position. IV -
Multiple display fields, display aiding, and
interference
A74-36751

VISUAL FIELDS

Uncertainty sets associated with saccadic eye
movements - Basis of satisfaction control
A74-37908

VISUAL PERCEPTION

Haidinger's brushes and predominant orientation of
collagen in corneal stroma
A74-36421
Lythgoe's visual stereophenomenon in the natural
environment - A possible factor in air and
highway accidents
A74-36753
Experimental evaluation of an airborne
illumination system
A74-36754
Sight and mind: An introduction to visual perception
--- Book
A74-36771
Evidence for the inhibition hypothesis in expanded
angle illusion
A74-37046
Form-specific colour after effects in scotopic
illumination
A74-37047
Eye-movements and visual perception --- Book
A74-37093
Personality correlates of visual perceptual
responses
A74-37374
Perception of size at the detection threshold -
Its accuracy and possible mechanisms
A74-37909
Step size in the Munsell color order system
N74-27567
A measurement of the anisotropic modulation
transfer function of the extrafoveal human
visual system
[AD-777853] N74-28624
The electrical response of the eye at varying
intervals following an adapting flash exposure
--- electrophysiological and psychophysiological
observations
[AD-778342] N74-28628
Transfer from audiovisual pretraining to a
continuous perceptual motor task
[AD-778078] N74-28647
VISUAL SIGNALS
Detection of changes in spatial position. IV -
Multiple display fields, display aiding, and
interference
A74-36751
Effects of background event rate and critical
signal amplitude on vigilance performance
A74-37373
VISUAL STIMULI
Peripheral visual response time and visual display
layout
A74-35564
Effects of hypoxia on peripheral visual response
to rapid sustained stimulation
A74-36217
Cortical and intracortical study of parietal and
temporal evoked visual potentials in
photosensitive baboons
A74-36359
The apparent heaviness of colours
A74-36422
Human binocular summation at absolute threshold
A74-37907
Perception of size at the detection threshold -
Its accuracy and possible mechanisms
A74-37909
Peripheral visual response time to colored stimuli
imaged on the horizontal meridian
[NASA-TM-X-3086] N74-27557
VISUAL TASKS
Comparative investigations of the learning process
in tracking tests of constant or quasi-constant
and self-adapting difficulty level. I - Middle
learning level - Reliability - Antagonism
learning/fatigue. II - Differential diagnostic
parameters - Relevant or irrelevant additional
signals
A74-36399

SUBJECT INDEX

WORK CAPACITY

Effects of aircraft altitude and speed on
air-to-ground visual target acquisition
A74-36474

Visual and manual workload of the helicopter pilot
[AHS PREPRINT 821] A74-36625

Effects of background event rate and critical
signal amplitude on vigilance performance
A74-37373

Personality correlates of visual perceptual
responses
A74-37374

Studies on visual pattern recognition in man and
animals
A74-37910

Peripheral visual response time to colored stimuli
imaged on the horizontal meridian
[NASA-TM-X-3086] N74-27557

VITAMINS

Effects of vitamins on the penetration of
lipoate-S sup 35 into the cells of animals
subjected to acceleration
N74-28589

VJ-101 AIRCRAFT

Results of telemetric stress measurements of
pulse-and respiratory frequency on the VJ 101 C
- X 2, and a proposal for the use of a
standardized evaluation program for the future
treatment of such investigations
N74-28640

VOLCANOLOGY

Discovery of amino acids in regions of present-day
volcanic activity
N74-28590

W

WAKEFULNESS

Regularity in the control of the free-running
sleep-wakefulness rhythm
A74-36467

The consequences of degradations of the awake
state on ocular positioning by saccadic movements
A74-37007

WASTE DISPOSAL

Development testing of a shuttle urine collection
system
[NASA-CR-134337] N74-27572

Development of integrated, zero-g pneumatic
transporter/rotating paddle
incinerator/catalytic afterburner subsystem for
processing human wastes on board spacecraft
[NASA-CR-114763] N74-27575

WASTE UTILIZATION

G-189A analytical simulation of the integrated
waste management-water system using
radioisotopes for thermal energy
[NASA-CR-120251] N74-28629

WATER

Discovery of amino acids in regions of present-day
volcanic activity
N74-28590

WATER BALANCE

Effects of acute exposure to hypobaric hypoxia on
water contents in the blood and several tissues
in the rat
A74-36654

WATER CIRCULATION

Objective approach to a design of a whole-body,
water-cooled suit
A74-36469

WATER LOSS

Respiratory heat loss at increased core temperature
A74-36219

WATER RECLAMATION

G-189A analytical simulation of the integrated
waste management-water system using
radioisotopes for thermal energy
[NASA-CR-120251] N74-28629

Vacuum distillation/vapor filtration water recovery
[NASA-CR-120303] N74-28632

WATER TEMPERATURE

Determination of the zone of thermal neutrality in
water
[RAE-LIB-TRANS-1704] N74-27546

WAVEFORMS

Detection of the K-complex in human EEG sleep
records
[AD-777243] N74-27560

WEIGHTLESSNESS

Doctor in space --- Skylab crew medical experiences
A74-38027

Development testing of a shuttle urine collection
system
[NASA-CR-134337] N74-27572

Results of examination of the crew of the Salyut
space station in a functional test with creation
of negative pressure on the lower half of the body
N74-28580

WHALES

Techniques development for whale migration tracking
[NASA-CR-138830] N74-28557

WILDLIFE RADIOLOCATION

Techniques development for whale migration tracking
[NASA-CR-138830] N74-28557

WORK CAPACITY

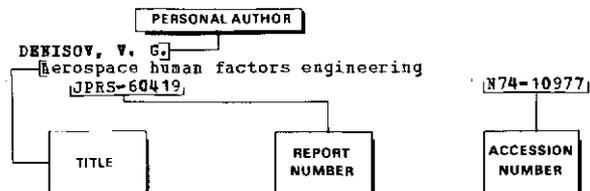
Pilot workload during instrument flight
[AHS PREPRINT 820] A74-36624

Visual and manual workload of the helicopter pilot
[AHS PREPRINT 821] A74-36625

Personal Author Index

AEROSPACE MEDICINE AND BIOLOGY / *A Continuing Bibliography (Suppl. 133)* OCTOBER 1974

Typical Personal Author Index Listing



The title of the document is used to provide the user with a brief description of the subject matter. The NASA or AIAA accession number is included in each entry to assist the user in locating the abstract in the abstract section of this supplement. If applicable, a report number is also included as an aid in identifying the document.

A

- AFANASENKO, N. E.**
The development of an experimental human-operator sensory system
A74-37011
- AGNEW, H. W., JR.**
Regularity in the control of the free-running sleep-wakefulness rhythm
A74-36467
- AKIYAMA, T.**
Changes in the plasma electrolyte levels of the rabbits during acute exposure to simulated high altitude
A74-36652
Effects of acute exposure to hypobaric hypoxia on water contents in the blood and several tissues in the rat
A74-36654
- ALDJEM, M.**
Objective approach to a design of a whole-body, water-cooled suit
A74-36469
- ALEKHINA, T. P.**
Peculiarities of the chemical composition of green plants during their prolonged cultivation on an ionite substrate
N74-28577
- ALEKSAKHIN, B. W.**
Experimental investigation of the influence of loads of variable sign on pilot efficiency and passenger comfort
A74-36564
- ALEKSANDROV, G. V.**
Effect of the psychophysiological properties of a pilot on the choice of the dynamic characteristics of an aircraft
A74-36506
- ALEKSANDROV, S. N.**
Ultraviolet fluorescence of myeloid cells in the bone marrow of dogs exposed to chronic radiation
N74-28588
- ALEXANDER, J. K.**
Echocardiographic assessment of left ventricular function with special reference to normalized velocities
A74-36974
- ALLEN, J. R.**
Design and fabricate a pair of Rancho anthropomorphic manipulator arms [NASA-CR-120275]
N74-27568

- ANDRIANOVA, L. A.**
State of the neurosecretory nuclei of the hypothalamus after combined exposure to acceleration and ionizing radiation
N74-28571
- ANGIBOUST, R.**
The consequences of degradations of the awake state on ocular positioning by saccadic movements
A74-37007
- ANGRICK, E. J.**
Oxygen effects on mortality of mice infected with *Diplococcus pneumoniae*
A74-36471
- APOSTOLOFF, E.**
Studies on the detection of clinically silent involvement of muscle in lupus erythematosus [NASA-TT-F-15804]
N74-28620
- ARAHAKI, S.**
Consideration of investigation on reading error of aircraft instruments
A74-36653
- ARNOLD, T.**
Heart rate and energy-yielding substrates in blood during long-lasting running
A74-36398
- ASHARE, A. E.**
G suit filling pressures determined by seat back angle
A74-36476
- ASTRAND, P.-O.**
Hemodynamic and respiratory responses compared in swimming and running
A74-36214
- ATAMANOVA, O. E.**
Effectiveness of administration of amytravite and ATP during prolonged irradiation
N74-28570
- AZBEVSKIY, P. Y.**
Man's mineral balance during ten-day confinement at a constant ambient temperature of 40 deg
N74-28584

B

- BAILEY, J. J.**
A method for evaluating computer programs for electrocardiographic interpretation. I - Application to the experimental IBM program of 1971
A74-36976
- A method for evaluating computer programs for electrocardiographic interpretation. II - Application to version D of the PHS program and the Mayo Clinic program of 1968
A74-36977
- A method for evaluating computer programs for electrocardiographic interpretation. III - Reproducibility testing and the sources of program errors
A74-36978
- BAILEY, R. W.**
Soft (hydrophilic) contact lenses in US Army aviation: An investigative study of the Bausch and Lomb Soflens [AD-776353]
N74-27580
- BAKE, B.**
Effect of inspiratory flow rate on regional distribution of inspired gas
A74-36209
- BANGEN, P.**
Hematological studies after rapid decompression [ESRO-TT-61]
N74-28623

Preceding page blank

- BARKER, R. S.
G-189A analytical simulation of the integrated waste management-water system using radioisotopes for thermal energy [NASA-CR-120251] N74-28629
- BARTHELMS, E.
Studies on the detection of clinically silent involvement of muscle in lupus erythematosus [NASA-TT-F-15804] N74-28620
- BASSETT, A.
Acute lupus erythematosus with complete deficiency of the C4 fraction of complement [NASA-TT-F-15727] N74-28563
- BAUR, P. S.
Pine structure of tannin accumulations in callus cultures of *Pinus elliotti* /slash pine/ A74-36195
- BEHAN, R. A.
Some NASA contributions to human factors engineering: A survey [NASA-SP-5117] N74-28633
- BELYANIN, V. N.
Experiment with the incorporation of vegetable plants in a semiclosed life support system N74-28576
- BEN-NORDECHAI, J.
Objective approach to a design of a whole-body, water-cooled suit A74-36469
- BENJAMIN, M.
Effect of carbon monoxide on cardiac weight as compared with altitude effects A74-36218
- BISGARD, J. C.
Preliminary evaluation of portable aviation oxygen systems [AD-776348] N74-27581
- BITIR, P.
Level, peculiarities and effects of coal mine noise on pit workers N74-28390
- BLAKE, J. C.
Effect of motion frequency spectrum on subjective comfort response [REPT-403212] N74-28630
- BLUNT, H. H.
A micromixing method for determination of oxygen equilibria in blood A74-36222
- BOGOMOLETS, N. N.
The problem of skin diseases in workers engaged in the machining of chromium alloyed steels [AD-776928] N74-28626
- BOGREN, H. G.
The variable spectrum of echocardiographic manifestations of the mitral valve prolapse syndrome A74-36973
- BONTHAGEN, E. L.
Design and fabricate a pair of Rancho anthropomorphic manipulator arms [NASA-CR-120275] N74-27568
- BORDACHAR, J.
Oxygen deficit and debt in submaximal exercise at sea level and high altitude A74-36213
- BORISON, H. L.
Influence of hypoxia on tidal volume response to CO2 in decerebrate cats A74-37739
- BORISOV, P. O.
Method of magnetobiological indication in clinical laboratory practice N74-28613
- BOUPELIER, C.
Determination of the zone of thermal neutrality in water [RAB-LIB-TRANS-1704] N74-27546
- BOYKIN, E. B.
Microbial detection method based on sensing molecular hydrogen A74-36374
- BOYKO, N. B.
Experimental data on the influence of irradiation of food products by protons and gamma radiation N74-28569
- BOYNTON, R. M.
Human binocular summation at absolute threshold A74-37907
- BOZHKO, A. N.
Peculiarities of the chemical composition of green plants during their prolonged cultivation on an ionite substrate N74-28577
- BRADLEY, F. D.
Scientific publications and presentations relating to planetary quarantine. Volume 5: The 1973 supplement [NASA-CR-138898] N74-28554
- BRANTIGAN, J. W.
Tissue gases during hypovolemic shock A74-36221
- BRAUN, E. G.
Soft (hydrophilic) contact lenses in US Army aviation: An investigative study of the Bausch and Lomb Soflens [AD-776353] N74-27580
- BRAZHEVNIK, E. S.
Effect of cutting off the septal afferentia on acetylcholinesterase activity in the short-axon neurons of the hippocampus A74-36936
- BRERKHAN, I. I.
Accumulation of quinones in the bodies of mice during hyperoxia N74-28574
- BRIAUD, B.
Effect of heat on growth hormone secretion and adrenal cortex activity in rats A74-36363
- BRISKIN, A. I.
Effect of thyrocalcitonin on water-mineral metabolism in rabbits during prolonged restriction of mobility N74-28572
- BROWN, O. R.
An improved method for echographic detection of left atrial enlargement A74-36975
- BUBLIS, V. V.
Effect of magnetic bracelets on the coagulation and anticoagulation systems of the blood of patients with hypertension N74-28618
- BUCHER, B.
Effect of heat on growth hormone secretion and adrenal cortex activity in rats A74-36363
- BUMENKO, A. M.
Long term effect on high vacuum on microorganisms [NASA-TT-F-15720] N74-28564
- BUHOV, Y. V.
Effect of imipramine, nitrazepam and sodium hydroxybutyrate on sleep impairments caused by emotional stress N74-28575
- BURRELL, G. J.
The format and color of small matrix displays for use in high ambient illumination A74-35565
- BURTON, R. R.
Physiologic responses to high sustained plusGz acceleration [AD-777604] N74-27559
- BUSHMAN, E. F.
All-exotic materials used in NASA's Skylab/Space Shuttle crews' bump protective helmets A74-35839
- BYCHKOV, V. P.
Experimental data on the influence of irradiation of food products by protons and gamma radiation N74-28569
- BYKOVA, Y. I.
Study of the possibility of use of decompression of the lower body in diagnosis of body predisposition to a syncopal state N74-28581

C

- CAPONE, R. J.
A comparison of regional blood flow and oxygen utilization during dynamic forearm exercise in normal subjects and patients with congestive heart failure A74-36980

- CASTLEBERRY, H. B.
Influence of bedrest and hypercapnia upon urinary mineral excretion in man
A74-36475
- CASTON, J.
Fibers projecting onto the Crista ampullaris of the vertical anterior semicircular canal from other ipsilateral vestibular receptors in the frog /Rana esculenta/
A74-36324
- CATIER, J.
Cortical and intracortical study of parietal and temporal evoked visual potentials in photosensitive baboons
A74-36359
- CHARMASSON, G.
Cortical and intracortical study of parietal and temporal evoked visual potentials in photosensitive baboons
A74-36359
- CHEM, S. J.
A mechanical model of the human ligamentous spine and its application to the pilot ejection problem
N74-28556
- CHEM, W.
Arterial pulse wave pressure transducer [NASA-CASE-GSC-11531-1]
N74-27566
- CHEKONOMORETS, V. A.
The development of an experimental human-operator sensory system
A74-37011
- CHEBENYKH, I. V.
Dosimetric investigations aboard the Salyut orbital space station
N74-28568
- CHISUM, G. T.
Flashblindness following double flash exposures [AD-777698]
N74-27562
The electrical response of the eye at varying intervals following an adapting flash exposure [AD-778342]
N74-28628
- CITTA, M.
The human operator in a tracking task - Foresight and strategy
A74-37009
- COCULESCU, M.
Level, peculiarities and effects of coal mine noise on pit workers
N74-28390
- COGGI, J. V.
G-189A analytical simulation of the integrated waste management-water system using radioisotopes for thermal energy [NASA-CR-120251]
N74-28629
- COLIN, J.
Determination of the zone of thermal neutrality in water [RAE-LIB-TRANS-1704]
N74-27546
- COLLINS, J. F.
Personality correlates of visual perceptual responses
A74-37374
- COOKE, J. P.
Evaluation of intratracheal cuffs for aeromedical evacuation [AD-776319]
N74-28646
- COWGER, R. I.
A measurement of the anisotropic modulation transfer function of the extrafoveal human visual system [AD-777853]
N74-28624
- CROSLEY, J. K.
Soft (hydrophilic) contact lenses in US Army aviation: An investigative study of the Bausch and Lomb Soflens [AD-776353]
N74-27580
- CROSS, K. D.
Crew system design [AD-777996]
N74-28641
- CROSSLEY, R. J.
Physiologic responses to high sustained plusGz acceleration [AD-777604]
N74-27559
- CUNNINGHAM, D. A.
Cardiopulmonary function in prospective competitive swimmers and their parents
A74-36210
- CURTIS, J. L.
Development of an electronic nebulized-humidifier [AD-778082]
N74-27564
Development of a litter access device for C-141 aeromedical aircraft [AD-777147]
N74-27578
- D**
- DANKNER, A.
Some aspects of sound discomfort caused by streetcar traffic
N74-28397
- DARDANO, J. P.
Response-produced timeouts under a progressive-ratio schedule with a punished reset option
A74-35988
- DARLEA, I. G.
Level, peculiarities and effects of coal mine noise on pit workers
N74-28390
- DAS, H. K.
Blood sugar levels in rats exposed to varying altitude stress for different periods of time
A74-36470
- DAVIDOVA, S. A.
Effectiveness of administration of amytravite and ATP during prolonged irradiation
N74-28570
- DAWSON, L. M.
Peripheral visual response time to colored stimuli imaged on the horizontal meridian [NASA-TN-X-3086]
N74-27557
- DECATUR, R. A.
Psychological factors related to the voluntary use of hearing protection in hazardous noise environments [AD-777520]
N74-27579
- DEGEN, I. L.
Influence of a constant and variable magnetic field on the coagulation of human blood in vitro and in vivo
N74-28612
Treatment of the external epicondylitis of the humerus with a magnetic field
N74-28619
- DEGTYAREV, V. A.
Results of examination of the crew of the Salyut space station in a functional test with creation of negative pressure on the lower half of the body
N74-28580
- DENARIA, A. N.
The variable spectrum of echocardiographic manifestations of the mitral valve prolapse syndrome
A74-36973
- DEMPSEY, J. A.
Evidence of altered regulation of ventilation during exposure to hypoxia
A74-37742
- DENOLIN, H.
Hemodynamics in obesity: A brief review [NASA-TT-P-15826]
N74-28562
- DI PRAMPERO, P. E.
Energetics of swimming in man
A74-36208
- DICARLO, D. J.
Helicopter flight investigation to determine the effects of a closed-circuit TV on performance of a precision sling-load handling task [AHS PREPRINT 862]
A74-36602
- DITCHEBURN, R. W.
Eye-movements and visual perception
A74-37093
- DMITRIYEV, B. S.
Effect of thyrocalcitonin on water-mineral metabolism in rabbits during prolonged restriction of mobility
N74-28572
- DO PICO, G.
Evidence of altered regulation of ventilation during exposure to hypoxia
A74-37742
- DOBRYAKOV, A. D.
Accumulation of quinones in the bodies of mice during hyperoxia
N74-28574

- DOERING, B.**
A simulation method for the investigation and improvement of interaction at the man-machine interface using a digital computer
N74-28638
- DOROSHEV, V. G.**
Results of examination of the crew of the Salyut space station in a functional test with creation of negative pressure on the lower half of the body
N74-28580
- DOUGHERTY, E.**
Techniques development for whale migration tracking [NASA-CR-138830]
N74-28557
- DOWD, P. J.**
Proposed spatial orientation flight training concept
A74-36477
- DRAGONAT, P.**
Spirographic investigation of the ventilatory lung function under hyperbaric conditions
A74-36400
- DRAKE, R.**
A television method for measuring capillary red cell velocities
A74-36223
- DRENCKHAHN, D.**
Spirographic investigation of the ventilatory lung function under hyperbaric conditions
A74-36400
- DRUZHININ, I. P.**
The problem of the periodicity of the epidemic process
N74-28604
Statistical evaluation of the significance of the influence of abrupt changes in solar activity on the dynamics of the epidemic process
N74-28605
- DUBOVA, V. M.**
Method of magnetobiological indication in clinical laboratory practice
N74-28613
- DUPFAUT, M.**
Present notions on the psychological selection of aircrews
A74-37000
- DUNHAM, E.**
Effect of carbon monoxide on cardiac weight as compared with altitude effects
A74-36218
- DUPONT, J.**
The pilot candidate's image of his profession
A74-36999
- DUPUIS, H.**
Shock tests with dummies and their evaluation
A74-36686
The effect of stochastic /mechanical/ vibrations on physiological and psychological functions and on subjective perception
A74-37075
- DURAND, J.**
Oxygen deficit and debt in submaximal exercise at sea level and high altitude
A74-36213

E

- EDWARDS, R. S.**
Interactions, range effects, and comparisons between tasks in experiments measuring performance with pairs of stresses - Mild heat and 1 mg of L-hyoscyne hydrobromide
A74-36472
- EGBERT, D. E.**
Ocular damage thresholds for repetitive pulsed argon laser exposure [AD-777144]
N74-28625
- EKBLOM, B.**
Hemodynamic and respiratory responses compared in swimming and running
A74-36214
- ELLIS, B.**
The format and color of small matrix displays for use in high ambient illumination
A74-35565
- ENERGY, A. P.**
Electromagnetic power deposition in man exposed to high-frequency fields and the associated thermal and physiologic consequences [AD-776821]
N74-28627

- ERLANDSON, R. F.**
Uncertainty sets associated with saccadic eye movements - Basis of satisfaction control
A74-37908
- EYNON, R. B.**
Cardiopulmonary function in prospective competitive swimmers and their parents
A74-36210

F

- FALCKENBERG, B.**
Pilot factor in aircraft accidents of the German Federal Armed Forces
A74-37004
- FARHI, L. E.**
Hypoxia and tissue gas exchange [AD-777158]
N74-27558
- FARR, W.**
Proteolytic enzymes and protein metabolism in rabbit erythrocytes during cell maturation in vivo [NASA-TM-X-15731]
N74-27555
- FERNSTROM, J. D.**
Brain catechol synthesis - Control by brain tyrosine concentration
A74-35335
- FEUERLEIN, K. G.**
The effect of stochastic /mechanical/ vibrations on physiological and psychological functions and on subjective perception
A74-37075
- FICHTBAUER, S.**
Study of relations among the behavioral patterns, sociometric indices, and performance in pilot training at a commercial aviation school
A74-37002
- FIELDS, S. F.**
Development of integrated, zero-g pneumatic transporter/rotating paddle incinerator/catalytic afterburner subsystem for processing human wastes on board spacecraft [NASA-CR-114763]
N74-27575
- FIRSOV, L. A.**
The generalization function in monkeys - Physiological aspect
A74-37325
- FLEMING, D. G.**
Uncertainty sets associated with saccadic eye movements - Basis of satisfaction control
A74-37908
- FORGAYS, D. G.**
Isolation and sensory communication [AD-777156]
N74-27577
- FORSTER, H. V.**
Evidence of altered regulation of ventilation during exposure to hypoxia
A74-37742
- FOSTER, B. G.**
Aeromonas proteolytica bacteria in aerospace environments [NASA-CR-134328]
N74-28560
- FRANCIS, D. A.**
Joint Army Navy air crew impact injury prevention program [AD-777713]
N74-27582
- FRAZIER, J. W.**
G suit filling pressures determined by seat back angle
A74-36476
- FREUND, J. L.**
The effect of stochastic /mechanical/ vibrations on physiological and psychological functions and on subjective perception
A74-37075
- FRIEDMAN, W. F.**
Multiple crystal echocardiographic evaluation of endocardial cushion defect
A74-36972

G

- GAASCH, W. H.**
Echocardiographic assessment of left ventricular function with special reference to normalized velocities
A74-36974

- GALLE-TESSONNEAU, MR.
Adjustment and maladjustment in elementary pilot training
A74-36998
- GARBOVSKYY, V. V.
Cardiac rhythm computer analysis techniques
[NASA-TT-F-15733] N74-27574
- GASKILL, P. B.
Hearing threshold sensitivity in airline pilots
A74-36478
- GATELY, W.
Guidelines for a training course in noise survey techniques
[AD-776631] N74-28645
- GAUDRIault, P.
Experimental study of a specific projective test for the evaluation of adjustment to the aviation environment
A74-37003
- GELLY, R.
Psychotherapy for aircrew members
A74-36996
- GENTRY, R.
Techniques development for whale migration tracking
[NASA-CR-138830] N74-28557
- GEORGIEV, V. I.
Regional vascular changes after functional loading
A74-35525
- GERASIMOVICH, A. A.
Psychopharmacological regulation of interpersonal relationships in a group (experimental investigation)
N74-28578
- GERATHOHL, S. J.
The role of man in system safety
A74-37006
- GERLACH, V. S.
Transfer from audiovisual pretraining to a continuous perceptual motor task
[AD-778078] N74-28647
- GHAEM, A.
Reaction of the resistive and capacitive vessels of the hand at the start of muscular exercise
A74-36360
- GROSH, W. C.
Blood sugar levels in rats exposed to varying altitude stress for different periods of time
A74-36470
- GIANNETTA, C. L.
Influence of bedrest and hypercapnia upon urinary mineral excretion in man
A74-36475
- GIBBONS, W. D.
Ocular damage thresholds for repetitive pulsed argon laser exposure
[AD-777144] N74-28625
- GIBSON, R. J.
Techniques development for whale migration tracking
[NASA-CR-138830] N74-28557
- GILGEN, A.
Studies on room ozonizers and on ozone occurrence in the outside air and in industrial plants
[APTIC-07834] N74-27551
- GILLETTE, R. B.
Laboratory demonstration model: Active cleaning technique device
[NASA-CR-120292] N74-28631
- GITELZON, I. I.
Experiment with the incorporation of vegetable plants in a semiclosed life support system
N74-28576
- GLEZEN, V. D.
Studies on visual pattern recognition in man and animals
A74-37910
- GOLAND, L. G.
Effect of restricted motor activity on the enzyme secretion function of the pancreas and extrasecretory function of the liver in rats
N74-28573
- GOLDMAN, A. I.
Ocular hazard from picosecond pulses of Nd:YAG laser radiation
A74-36414
- GOLDSTEIN, S. R.
A servo-force balance isometric muscle force transducer
A74-36224
- GOLOTIN, V. G.
Accumulation of quinones in the bodies of mice during hyperoxia
N74-28574
- GOLOVAN, E. T.
The development of an experimental human-operator sensory system
A74-37011
- GOLOVKIN, L. G.
Man's mineral balance during ten-day confinement at a constant ambient temperature of 40 deg
N74-28584
- GOMENKO, V. A.
Accumulation of quinones in the bodies of mice during hyperoxia
N74-28574
- GOODMAN, A. H.
A television method for measuring capillary red cell velocities
A74-36223
- GOODMAN, H. W.
Some observations on the homogeneity of response of single chemoreceptor fibres
A74-37740
- GOODMAN, R. H.
Techniques development for whale migration tracking
[NASA-CR-138830] N74-28557
- GORELICK, D.
Arterial pulse wave pressure transducer
[NASA-CASE-GSC-11531-1] N74-27566
- GRAUER, L. E.
A method for evaluating computer programs for electrocardiographic interpretation. I - Application to the experimental IBM program of 1971
A74-36976
- A method for evaluating computer programs for electrocardiographic interpretation. II - Application to version D of the PHS program and the Mayo Clinic program of 1968
A74-36977
- GREEN, M.
Variability of maximum expiratory flow-volume curves
A74-36216
- GRIBENSKI, A.
Fibers projecting onto the Crista ampullaris of the vertical anterior semicircular canal from other ipsilateral vestibular receptors in the frog /Rana esculenta/
A74-36324
- GROH, F.
Proteolytic enzymes and protein metabolism in rabbit erythrocytes during cell maturation in vivo
[NASA-TM-X-15731] N74-27555
- GROSS, M. H.
Peripheral visual response time to colored stimuli imaged on the horizontal meridian
[NASA-TM-X-3086] N74-27557
- GROSSMANS, E.
Acute lupus erythematosus with complete deficiency of the C4 fraction of complement
[NASA-TT-F-15727] N74-28563
- GUY, A. W.
Electromagnetic power deposition in man exposed to high-frequency fields and the associated thermal and physiologic consequences
[AD-776821] N74-28627
- GUTTON, A. C.
A television method for measuring capillary red cell velocities
A74-36223

H

- HADHI, J. C.
Psychotherapy for aircrew members
A74-36996
- HAGIHARA, H.
Consideration of investigation on reading error of aircraft instruments
A74-36653
- HAINES, R. F.
Peripheral visual response time and visual display layout
A74-35564
- Peripheral visual response time to colored stimuli imaged on the horizontal meridian
[NASA-TM-X-3086] N74-27557

- HALBERG, F.
Glossary of selected chronobiologic terms
A74-36229
- HAN, W. T., JR.
Ocular hazard from picosecond pulses of Nd:YAG
laser radiation
A74-36414
- HANSON, R.
Respiratory heat loss at increased core temperature
A74-36219
- HARALAMBIE, G.
Heart rate and energy-yielding substrates in blood
during long-lasting running
A74-36398
- HARRISON, D. C.
An improved method for echographic detection of
left atrial enlargement
A74-36975
- HARRISON, M. H.
Plasma volume changes during acute exposure to a
high environmental temperature
A74-36212
- HARTUNG, E.
The effect of stochastic /mechanical/ vibrations
on physiological and psychological functions and
on subjective perception
A74-37075
- HASBROOK, A. H.
Study of control force limits for female pilots
[AD-777839]
N74-27585
- HASCHEN, R. J.
Proteolytic enzymes and protein metabolism in
rabbit erythrocytes during cell maturation in vivo
[NASA-TM-X-15731]
N74-27555
- HASKITT, P. B.
A two compartmental model of the respiratory system
[PB-228669/8]
N74-27565
- HATFIELD, S. A.
Sequential task performance - Task module
relationships, reliabilities, and times
A74-36752
- HAUN, C. C.
A study of the biological effect of continuous
inhalation exposure of 1, 1, 1-trichloroethene
(methyl chloroform) on animals
[NASA-CR-134323]
N74-27550
- HAUPTMAN, G.
Acute lupus erythematosus with complete deficiency
of the C4 fraction of complement
[NASA-TT-F-15727]
N74-28563
- HAWARD, L. R. C.
Effects of domestic stress upon flying proficiency
A74-36997
- HAWKINS, T. D. F.
The format and color of small matrix displays for
use in high ambient illumination
A74-35565
- HEID, E.
Acute lupus erythematosus with complete deficiency
of the C4 fraction of complement
[NASA-TT-F-15727]
N74-28563
- HEINZE, W.
Method for measuring eye movements of pilots,
exemplified for ILS approaches
N74-28639
- HIDERIKO, O.
Concerning the effects of air pollution on the
human organism in the Yokkaichi region
[APTIC-47896]
N74-27554
- HILAIRE, G.
Study of the ventilation function during thermal
or hypocapnic polypnea
A74-36361
- Phrenic motoneuron activity during thermal or
hypocapnic polypnea
A74-36364
- HILGENDORF, R. L.
Effects of aircraft altitude and speed on
air-to-ground visual target acquisition
A74-36474
- Experimental evaluation of an airborne
illumination system
A74-36754
- HILL, J. W.
Study to design and develop remote manipulator
system
[NASA-CR-137528]
N74-27571
- HILLIARD, S. A.
Vertex evoked potentials in a rating-scale
detection task: Relation to signal probability
[NASA-CR-138796]
N74-27573
- HINCKLEY, J. O. N.
Transphoresis and isotachophoresis as preparative
techniques with reference to zero-gravity
[AIAA PAPER 74-664]
A74-35911
- BIRSHFELD, J. W., JR.
A method for evaluating computer programs for
electrocardiographic interpretation. I -
Application to the experimental IBM program of
1971
A74-36976
- A method for evaluating computer programs for
electrocardiographic interpretation. II -
Application to version D of the PHS program and
the Mayo Clinic program of 1968
A74-36977
- HOBBS, L.
Techniques development for whale migration tracking
[NASA-CR-138830]
N74-28557
- HOLLAND, L. E.
Ocular hazard from picosecond pulses of Nd:YAG
laser radiation
A74-36414
- HOLMER, I.
Hemodynamic and respiratory responses compared in
swimming and running
A74-36214
- Body composition, sinking force, and oxygen uptake
of man treading water
A74-36215
- HONEGGER, E. J.
Development of integrated, zero-g pneumatic
transporter/rotating paddle
incinerator/catalytic afterburner subsystem for
processing human wastes on board spacecraft
[NASA-CR-114763]
N74-27575
- Vacuum distillation/vapor filtration water recovery
[NASA-CR-120303]
N74-28632
- HOPKIN, V. D.
Human factors principles in map design
A74-37008
- HORI, H.
The analysis of aviation training evaluations. I -
Effects of flying hours upon training evaluations
A74-36655
- HORTON, M.
A method for evaluating computer programs for
electrocardiographic interpretation. III -
Reproducibility testing and the sources of
program errors
A74-36978
- HORTON, M. R.
A method for evaluating computer programs for
electrocardiographic interpretation. I -
Application to the experimental IBM program of
1971
A74-36976
- A method for evaluating computer programs for
electrocardiographic interpretation. II -
Application to version D of the PHS program and
the Mayo Clinic program of 1968
A74-36977
- HUGHES, R. O.
Normal serum calcium levels in Air Force flying
personnel
A74-36473
- HUMPHREY, W. K.
The apparent heaviness of colours
A74-36422
- HUSTON, R. L.
User's manual for WCIN vehicle-occupant
crash-study model
[AD-778338]
N74-28648
- HUTSON, S. P.
Personality correlates of visual perceptual
responses
A74-37374
- HYNES, K. M.
Tissue gases during hypovolemic shock
A74-36221
- IMSHENETSKIY, A. A.
Long term effect on high vacuum on microorganisms
[NASA-TT-F-15720]
N74-28564

- INCE, F.**
Application of modern control theory to the design of man-machine systems
[AD-777163] N74-28643
- ISOBE, T.**
Time-domain analysis of characteristics of the human operator in a simple manual control system
A74-35991
- ITO, T.**
Consideration of investigation on reading error of aircraft instruments
A74-36653
- ITSCOITZ, S. B.**
A method for evaluating computer programs for electrocardiographic interpretation. I - Application to the experimental IBM program of 1971
A74-36976
A method for evaluating computer programs for electrocardiographic interpretation. II - Application to version D of the PHS program and the Mayo Clinic program of 1968
A74-36977
A method for evaluating computer programs for electrocardiographic interpretation. III - Reproducibility testing and the sources of program errors
A74-36978
- IVANOV-MORONSKII, K. A.**
The development of an experimental human-operator sensory system
A74-37011
- IVANOV, V. N.**
Effect of thyrocalcitonin on water-mineral metabolism in rabbits during prolonged restriction of mobility
N74-28572
- IZOSIMOV, G. V.**
Psychopharmacological regulation of interpersonality relationships in a group (experimental investigation)
N74-28578
- J**
- JACOBSON, I. D.**
Effect of motion frequency spectrum on subjective comfort response
[REPT-403212] N74-28630
- JOHNSON, C. C.**
Electromagnetic power deposition in man exposed to high-frequency fields and the associated thermal and physiologic consequences
[AD-776821] N74-28627
- K**
- KAGAMI, H.**
Changes in the plasma electrolyte levels of the rabbits during acute exposure to simulated high altitude
A74-36652
- KAIGORODOV, S. L.**
Experimental investigation of the influence of loads of variable sign on pilot efficiency and passenger comfort
A74-36564
- KALINICHENKO, I. R.**
Oxygen consumption by rats during prolonged breathing of an atmosphere with an increased carbon dioxide content
N74-28591
- KALINICHENKO, V. I.**
Discovery of amino acids in regions of present-day volcanic activity
N74-28590
- KALMYKOVA, N. D.**
Results of examination of the crew of the Salyut space station in a functional test with creation of negative pressure on the lower half of the body
N74-28580
- KAMPERMAN, G. W.**
Guidelines for a training course in noise survey techniques
[AD-776631] N74-28645
- KANDAUROVA, O. V.**
Investigation of assimilability of amino acids by man receiving an amino acid mixture
N74-28586
- KARCHAK, A., JR.**
Design and fabricate a pair of Rancho anthropomorphic manipulator arms
[NASA-CR-120275] N74-27568
- KAUFMAN, L.**
Sight and mind: An introduction to visual perception
A74-36771
- KELLEY, H. L.**
Helicopter flight investigation to determine the effects of a closed-circuit TV on performance of a precision sling-load handling task
[AHS PREPRINT 862] A74-36602
- KEREM, D.**
Effect of high ambient pressure on human apneic bradycardia
A74-36220
- KERNIN, J. P.**
Doctor in space
A74-38027
- KEUL, J.**
Heart rate and energy-yielding substrates in blood during long-lasting running
A74-36398
- KHAMYANOVA, N. V.**
Statistical evaluation of the significance of the influence of abrupt changes in solar activity on the dynamics of the epidemic process
N74-28605
- KHANDELWAL, G. S.**
Study of blood forming organ dose as a function of proton environment
[NASA-CR-132475] N74-28561
- KHOZHLOVA, O. S.**
Experimental data on the influence of irradiation of food products by protons and gamma radiation
N74-28569
Investigation of the state of human lipid metabolism in sealed chambers
N74-28585
- KHOLODOV, Y. A.**
Reactions of the nervous system to magnetic fields
N74-28606
- KIDERA, G. J.**
Hearing threshold sensitivity in airline pilots
A74-36478
- KIM, C.**
Arterial pulse wave pressure transducer
[NASA-CASE-GSC-11531-1] N74-27566
- KING, J. P.**
The variable spectrum of echocardiographic manifestations of the mitral valve prolapse syndrome
A74-36973
- KINKEAD, E. R.**
A study of the biological effect of continuous inhalation exposure of 1, 1, 1-trichloroethene (methyl chloroform) on animals
[NASA-CR-134323] N74-27550
- KIRILOVA, Z. A.**
Results of examination of the crew of the Salyut space station in a functional test with creation of negative pressure on the lower half of the body
N74-28580
- KISELEV, R. K.**
Man's mineral balance during ten-day confinement at a constant ambient temperature of 40 deg
N74-28584
- KISELKOVA, E. V.**
Regional vascular changes after functional loading
A74-35525
- KLEINHANSS, G.**
Shock tests with dummies and their evaluation
A74-36686
The effect of stochastic/mechanical/vibrations on physiological and psychological functions and on subjective perception
A74-37075
- KLUNG, H.**
Studies on the detection of clinically silent involvement of muscle in lupus erythematosus
[NASA-TT-F-15804] N74-28620
- KOBATAKE, H.**
Time-domain analysis of characteristics of the human operator in a simple manual control system
A74-35991
- ROBRICK, J. L.**
Effects of hypoxia on peripheral visual response to rapid sustained stimulation
A74-36217

KOCH, B.

PERSONAL AUTHOR INDEX

KOCH, B.
Effect of heat on growth hormone secretion and
adrenal cortex activity in rats
A74-36363

KOEHL, F.
Results of telemetric stress measurements of
pulse-and respiratory frequency on the VJ 101 C
- Y 2, and a proposal for the use of a
standardized evaluation program for the future
treatment of such investigations
N74-28640

KOENIG, N.
On functions and structure of deep layers of
immature auditory cortex
A74-36362

KOHNEN, B.
Layout and performance of anthropotechnical
experiments, exemplified by a flight simulator
investigation
N74-28637

KOLCHIN, Y. V.
Experimental data on the influence of irradiation
of food products by protons and gamma radiation
N74-28569

KONHYR, W. D.
Ozone in aircraft cabins
A74-36465

KONOVALENKO, Z. P.
The problem of the periodicity of the epidemic
process
N74-28604

KOPPEL, H.
The Myxomycetes
[NASA-CR-138841]
N74-28558

KOROTAYEV, M. M.
Characteristics of the immunological state of man
during hypoxic hypoxia
N74-28582

KOROTKOV, D. I.
The effect of three day hypodynamia on liver
function
[NASA-TT-F-15646]
N74-28566

KOTOVSKAYA, A. R.
Prediction of acceleration tolerance by means of a
decompression functioning test
A74-37532

KOVROV, B. G.
Experiment with the incorporation of vegetable
plants in a semiclosed life support system
N74-28576

KOZAR, M. I.
Experimental data on the influence of irradiation
of food products by protons and gamma radiation
N74-28569

KOZLOVA, S. B.
Dosimetric investigations aboard the Salyut
orbital space station
N74-28568

KRABING, K. K.
Electromagnetic power deposition in man exposed to
high-frequency fields and the associated thermal
and physiologic consequences
[AD-776821]
N74-28627

KRAUSE, H. E.
Impedance measurements for the development of a
nonlinear model of supine man
A74-36685

KREKELER, H.
Diffusional and metabolic components of nitrogen
elimination through the lungs
A74-36211

KROPINA, T. N.
Characteristics of the immunological state of man
during hypoxic hypoxia
N74-28582

KROSE, W.
The optimization of control gain by self-adjustment
A74-36658

KRUTKO, V. N.
Kinematic characteristics of motion of the human
head in different planes
N74-28587

KUKUSHKIN, Y. A.
Results of examination of the crew of the Salyut
space station in a functional test with creation
of negative pressure on the lower half of the body
N74-28580

KULTAS, K. N.
Effect of cutting off the septal afferentia on
acetylcholinesterase activity in the short-axon
neurons of the hippocampus
A74-36936

KUSUMOTO, S.
The chronic effects of nitrogen dioxide
[APTIC-40168]
N74-27553

KUWABARA, T.
Ocular hazard from picosecond pulses of Nd:YAG
laser radiation
A74-36414

KUZNETSOV, V. G.
Experimental investigation of the influence of
loads of variable sign on pilot efficiency and
passenger comfort
A74-36564

KUZNETZOV, O. N.
Problems in the selection of personnel operators
for closed ecologic systems and prophylactic
measures for neuropsychic disorders
[AD-777684]
N74-27583

L

LABAK, L. J.
Development of integrated, zero-g pneumatic
transporter/rotating paddle
incinerator/catalytic afterburner subsystem for
processing human wastes on board spacecraft
[NASA-CR-114763]
N74-27575

LANCE, G. M.
Progress in vestibular modeling
A74-35250

LAPSHINA, N. A.
Results of examination of the crew of the Salyut
space station in a functional test with creation
of negative pressure on the lower half of the body
N74-28580
Man's mineral balance during ten-day confinement
at a constant ambient temperature of 40 deg
N74-28584

LARIN, F.
Brain catechol synthesis - Control by brain
tyrosine concentration
A74-35335

LEBEDEV, V. I.
Problems in the selection of personnel operators
for closed ecologic systems and prophylactic
measures for neuropsychic disorders
[AD-777684]
N74-27583

LEE, J.-K.
Glossary of selected chronobiologic terms
A74-36229

LEPPER, R. C.
Study of control force limits for female pilots
[AD-777839]
N74-27585

LEIGHTON, R. F.
Detection of hypokinesia by a quantitative
analysis of left ventricular cineangiograms
A74-36979

LEOPOLD, G.
Multiple crystal echocardiographic evaluation of
endocardial cushion defect
A74-36972

LEUSHINA, L. I.
Studies on visual pattern recognition in man and
animals
A74-37910

LEVERETT, S. D., JR.
Physiologic responses to high sustained plusGz
acceleration
[AD-777604]
N74-27559

LEVY, B.
Reaction of the resistive and capacitive vessels
of the hand at the start of muscular exercise
A74-36360

LEWIS, R. B., II
Pilot workload during instrument flight
[AHS PREPRINT 820]
A74-36624

LEWIS, R. P.
Detection of hypokinesia by a quantitative
analysis of left ventricular cineangiograms
A74-36979

LIES, J. E.
The variable spectrum of echocardiographic
manifestations of the mitral valve prolapse
syndrome
A74-36973

- LIN, D. J.**
Observations on sacculi of rats exposed to long-term hypergravity
A74-36468
- LIN, J. C.**
Electromagnetic power deposition in man exposed to high-frequency fields and the associated thermal and physiologic consequences
[AD-776821] N74-28627
- LISOVSKIY, G. M.**
Experiment with the incorporation of vegetable plants in a semiclosed life support system
N74-28576
- LOBACHIK, V. I.**
Effect of thyrocalcitonin on water-mineral metabolism in rabbits during prolonged restriction of mobility
N74-28572
- LOPLIN, J. H.**
A television method for measuring capillary red cell velocities
A74-36223
- LONGHURST, J.**
A comparison of regional blood flow and oxygen utilization during dynamic forearm exercise in normal subjects and patients with congestive heart failure
A74-36980
- LOSCUTOFF, A. V.**
G-189A analytical simulation of the integrated waste management-water system using radioisotopes for thermal energy
[NASA-CR-120251] N74-28629
- LOVELOCK, J. E.**
Atmospheric homeostasis by and for the biosphere - The Gaia hypothesis
A74-35521
- LUCZAK, H.**
Statistical planning of ergonomic experiments. Possibilities and usefulness
N74-28635
- LUKIANOVA, O. N.**
The development of an experimental human-operator sensory system
A74-37011
- LUTZ, B.**
Effect of heat on growth hormone secretion and adrenal cortex activity in rats
A74-36363
- LUZ, G. A.**
Psychological factors related to the voluntary use of hearing protection in hazardous noise environments
[AD-777520] N74-27579
- LYSENKO, C. B.**
Long term effect on high vacuum on microorganisms
[NASA-TT-F-15720] N74-28564
- M**
- MACEWEN, J. D.**
A study of the biological effect of continuous inhalation exposure of 1, 1, 1-trichloroethene (methyl chloroform) on animals
[NASA-CR-134323] N74-27550
- MACHTA, L.**
Ozone in aircraft cabins
A74-36465
- MACKLEN, P. T.**
Effect of inspiratory flow rate on regional distribution of inspired gas
A74-36209
- MACLEOD, S.**
Effects of aircraft altitude and speed on air-to-ground visual target acquisition
A74-36474
- MALAKHOV, A. V.**
Experimental investigation of the influence of loads of variable sign on pilot efficiency and passenger comfort
A74-36564
- MALYJ, W., JR.**
Studies of peripheral circulatory rhythms in resting and exercising humans
A74-36228
- MARCHENKO, V. I.**
Influence of solar activity on fibrinolysis and fibrinogenolysis
N74-28599
- Fibrinolysis and fibrinogenolysis on magnetically-active days
N74-28600
- Influence of synoptic processes on fibrinolysis and fibrinogenolysis in healthy persons
N74-28601
- The influence of weather on fibrinolysis and fibrinogenolysis
N74-28602
- MARCUS, R. T.**
Step size in the Munsell color order system
N74-27567
- MARGULIS, I.**
Atmospheric homeostasis by and for the biosphere - The Gaia hypothesis
A74-35521
- MARKELOV, B. A.**
Influence of functional loads on the state of the phagocytic function of blood in dogs subjected to chronic gamma-irradiation
N74-28592
- MARKELOV, V. V.**
Dosimetric investigations aboard the Salyut orbital space station
N74-28568
- MARLIN, P. E.**
Detection of the K-complex in human EEG sleep records
[AD-777243] N74-27560
- MARTIN, R. M.**
Joint Army Navy air crew impact injury prevention program
[AD-777713] N74-27582
- MARTINEAU, B.**
Human cytomegalovirus (CMV) and indirect immunofluorescence in disseminated Lupus erythematosus
[NASA-TT-F-15712] N74-28565
- MARTINEAUD, J. P.**
Oxygen deficit and debt in submaximal exercise at sea level and high altitude
A74-36213
- Reaction of the resistive and capacitive vessels of the hand at the start of muscular exercise
A74-36360
- MARTY, R.**
On functions and structure of deep layers of immature auditory cortex
A74-36362
- MASAYUKI, I.**
Concerning the effects of air pollution on the human organism in the Yokkaichi region
[APTIC-47896] N74-27554
- MASHINSKIY, A. L.**
Peculiarities of the chemical composition of green plants during their prolonged cultivation on an ionite substrate
N74-28577
- MASLOV, A. M.**
Study of the possibility of use of decompression of the lower body in diagnosis of body predisposition to a syncopal state
N74-28581
- MASON, D. T.**
The variable spectrum of echocardiographic manifestations of the mitral valve prolapse syndrome
A74-36973
- A comparison of regional blood flow and oxygen utilization during dynamic forearm exercise in normal subjects and patients with congestive heart failure
A74-36980
- MASTER, R. L.**
Hepatic pathology in mice after continuous inhalation exposure to 1, 1, 1-trichloroethane
[NASA-CR-134322] N74-27556
- MATSKEVICHENE, V. B.**
Influence of a constant magnetic field on the fibrinogen-fibrin system
N74-28616
- Changes in the fibrinogen-fibrin system following a 20-hour exposure of rabbits to a magnetic field
N74-28617
- MATSNEV, E. I.**
Expert evaluation of the state of the nasal sinuses in cosmonaut candidates
N74-28579

- MATSUBA, Y.
Relationship between susceptibility to motion sickness and tolerance to Coriolis forces
A74-36656
- MAYER, S.
Acute lupus erythematosus with complete deficiency of the C4 fraction of complement
[NASA-TT-F-15727] N74-28563
- MCCABE, B. F.
Progress in vestibular modeling
A74-35250
- MCCARTHY, L. E.
Influence of hypoxia on tidal volume response to CO2 in decerebrate cats
A74-37739
- MCCONNELL, R. E.
Hepatic pathology in mice after continuous inhalation exposure to 1, 1, 1-trichloroethane
[NASA-CR-134322] N74-27556
- MCGOVERN, D. E.
Study to design and develop remote manipulator system
[NASA-CR-137528] N74-27571
- MCGRATH, J. J.
Crew system design
[AD-777996] N74-28641
- MCGREVEY, D. F.
Validation of two aircrew psychomotor tests
[AD-777830] N74-28642
- MCNEIL, R. J.
Preliminary evaluation of portable aviation oxygen systems
[AD-776348] N74-27581
- MCNUTT, W. S.
Hepatic pathology in mice after continuous inhalation exposure to 1, 1, 1-trichloroethane
[NASA-CR-134322] N74-27556
- HEAD, J.
Variability of maximum expiratory flow-volume curves
A74-36216
- HEDKOVA, I. L.
Effect of restricted motor activity on the enzyme secretion function of the pancreas and extrasecretory function of the liver in rats
N74-28573
- HEDEVEDV, M. H.
Effect of the psychophysiological properties of a pilot on the choice of the dynamic characteristics of an aircraft
A74-36506
- HEIER-DORNBURG, K. E.
Parameters for the description of shock effects and shock tolerance limits
A74-36687
- Human tolerance to shock - Evaluation criteria and limiting values
A74-36688
- HEINERL, G.
Quantitative effect of linear acceleration on positional alcohol nystagmus
A74-36466
- HETZGER, K. R.
Effects of background event rate and critical signal amplitude on vigilance performance
A74-37373
- MEYER, R. E.
Stress and the air traffic controller
A74-37010
- MEYEROVA, Y. A.
Influence of a constant magnetic field on thrombocytes
N74-28614
- Effect of magnetic bracelets on the coagulation and anticoagulation systems of the blood of patients with hypertension
N74-28618
- MIALHE, C.
Effect of heat on growth hormone secretion and adrenal cortex activity in rats
A74-36363
- MICHAEL, P. L.
Guidelines for a training course in noise survey techniques
[AD-776631] N74-28645
- MICHAELSON, E. D.
Physiologic responses to high sustained plusGz acceleration
[AD-777604] N74-27559
- MILIC-EMILI, J.
Effect of inspiratory flow rate on regional distribution of inspired gas
A74-36209
- MILLS, R. G.
Sequential task performance - Task module relationships, reliabilities, and times
A74-36752
- MIYAZAWA, T. Y.
Tissue gases during hypovolemic shock
A74-36221
- MOISE, G.
Some aspects of sound discomfort caused by streetcar traffic
N74-28397
- MOKROUSOVA, A. V.
Reactions of spinal cord interneurons of delabyrinthectomized cats during oscillation
N74-28593
- MONTEAU, R.
Study of the ventilation function during thermal or hypocapnic polypnea
A74-36361
- Phrenic motoneuron activity during thermal or hypocapnic polypnea
A74-36364
- MONTEPLAISIR, S.
Human cytomegalovirus (CMV) and indirect immunofluorescence in disseminated Lupus erythematosus
[NASA-TT-F-15712] N74-28565
- MORDVINOV, E. P.
The generalization function in monkeys - Physiological aspect
A74-37325
- MOREAU, H.
Present notions on the psychological selection of aircrews
A74-37000
- MORRIS, F.
Hepatic pathology in mice after continuous inhalation exposure to 1, 1, 1-trichloroethane
[NASA-CR-134322] N74-27556
- MORRISON, P.
Thermodynamics and the origin of life
A74-37437
- MORWAY, P. E.
Flashblindness following double flash exposures
[AD-777698] N74-27562
- MOSTAPAPOUR, S.
Brain catechol synthesis - Control by brain tyrosine concentration
A74-35335
- MUELLER, H. A.
Ocular hazard from picosecond pulses of Nd:YAG laser radiation
A74-36414
- MUKHIN, L. M.
Discovery of amino acids in regions of present-day volcanic activity
N74-28590
- MUKSIAN, R.
A model for the response of seated humans to sinusoidal displacements of the seat
A74-37924
- MURPHY, B.
Effect of inspiratory flow rate on regional distribution of inspired gas
A74-36209
- MUYERS, K.
Diffusional and metabolic components of nitrogen elimination through the lungs
A74-36211

N

- NAGASAWA, Y.
Consideration of investigation on reading error of aircraft instruments
A74-36653
- NAKABARA, K.
Relationship between susceptibility to motion sickness and tolerance to Coriolis forces
A74-36656
- NAKAJIMA, T.
The chronic effects of nitrogen dioxide
[APTIC-40168] N74-27553

- NAKAMURA, M.**
The analysis of aviation training evaluations. I -
Effects of flying hours upon training evaluations
A74-36655
- NASH, C. D., JR.**
A model for the response of seated humans to
sinusoidal displacements of the seat
A74-37924
- NEBE, H.**
Studies on the detection of clinically silent
involvement of muscle in lupus erythematosus
[NASA-TT-F-15804] N74-28620
- NEMCHENKO, N. S.**
Effect of coriolis acceleration accumulation on
catecholamine excretion
[NASA-TT-F-15736] N74-27547
- NESS, G. W.**
Cardiopulmonary function in prospective
competitive swimmers and their parents
A74-36210
- NEVERILL, R. B.**
Vacuum distillation/vapor filtration water recovery
[NASA-CR-120303] N74-28632
- NEVSKAIA, A. A.**
Studies on visual pattern recognition in man and
animals
A74-37910
- NEWMAN, P. A.**
Personality correlates of visual perceptual
responses
A74-37374
- NEWMAN, B. E.**
Ocular hazard from picosecond pulses of Nd:YAG
laser radiation
A74-36414
- NIERADT, C.**
To what extent is the glycolysis in mammalian
erythrocytes carried out via 2,3
diphosphoglyceric acid? About a variant of the
glycolytic cycle on the level of phosphoglyceric
acids
[RAE-LIB-TRANS-1724] N74-27545
- NORRIS, K. S.**
Techniques development for whale migration tracking
[NASA-CR-138830] N74-28557
- NOVIKOV, H. A.**
Psychopharmacological regulation of
interpersonality relationships in a group
(experimental investigation)
N74-28578
- NOVIKOVA, T. V.**
Psychopharmacological regulation of
interpersonality relationships in a group
(experimental investigation)
N74-28578
- NOWAKIWSKY, G. V.**
Effects of sonic boom on automobile-driver behaviour
[DTIAS-TN-188] N74-27576
- NYLEN, D.**
Peripheral visual response time to colored stimuli
imaged on the horizontal meridian
[NASA-TM-X-3086] N74-27557
- ODNEAL, B. L.**
Effect of map-of-the-earth requirements on aircrew
performance during night attack helicopter
operations
[AHS PREPRINT 863] A74-36603
- OKAUE, H.**
The analysis of aviation training evaluations. I -
Effects of flying hours upon training evaluations
A74-36655
- OKLADNIKOV, Y. N.**
Experiment with the incorporation of vegetable
plants in a semiclosed life support system
N74-28576
- OOSTERVELD, W. J.**
Quantitative effect of linear acceleration on
positional alcohol nystagmus
A74-36466
- OROURKE, R.**
Multiple crystal echocardiographic evaluation of
endocardial cushion defect
A74-36972
- OSTROUKOVA, L. H.**
Effectiveness of administration of amytravite
and ATP during prolonged irradiation
N74-28570
- OUEDRAOGO, C.**
Study of the ventilation function during thermal
or hypocapnic polypnea
A74-36361
- OTAMA, J.**
Observations on saccules of rats exposed to
long-term hypergravity
A74-36468
- P**
- PALMINA, S. I.**
Influence of functional loads on the state of the
phagocytic function of blood in dogs subjected
to chronic gamma-irradiation
N74-28592
- PAOLUCCI, G.**
Quantitative effect of linear acceleration on
positional alcohol nystagmus
A74-36466
- PARFENOV, Y. S.**
Method of magnetobiological indication in clinical
laboratory practice
N74-28613
- PARKER, D. H.**
Evidence for the inhibition hypothesis in expanded
angle illusion
A74-37046
- PASSERELLO, C. E.**
User's manual for UCIN vehicle-occupant
crash-study model
[AD-778338] N74-28648
- PATNE, W. R.**
A review of selected bioeffects thresholds for
various spectral ranges of light
[PB-228391/9] N74-27563
- PECAN, E. V.**
Carbon and the biosphere
[CONF-720510] N74-28621
- PENDBERGAST, D. R.**
Energetics of swimming in man
A74-36208
- PENNEY, D.**
Effect of carbon monoxide on cardiac weight as
compared with altitude effects
A74-36218
- PETERSON, R. W.**
A review of selected bioeffects thresholds for
various spectral ranges of light
[PB-228391/9] N74-27563
- PETRENKO, P. A.**
The development of an experimental human-operator
sensory system
A74-37011
- PETTYJOHN, P. S.**
Preliminary evaluation of portable aviation oxygen
systems
[AD-776348] N74-27581
- PIKSINA, L. D.**
Method of magnetobiological indication in clinical
laboratory practice
N74-28613
- PINKERTON, E.**
The apparent heaviness of colours
A74-36422
- PIRAMIAN, A. G.**
The effects of sustained acceleration, airframe
buffet, and aircraft flying qualities on
tracking performance
[AIAA PAPER 74-793] A74-37813
- PLARSENKO, V. I.**
Influence of a constant and variable magnetic
field on the coagulation of human blood in vitro
and in vivo
N74-28612
- PLATONOVA, A. T.**
Studies in Geomagnetism, aeronomy and solar
physics (problems of heliobiology and the
biological effect of magnetic fields)
[NASA-TT-F-15862] N74-28596
Heliobiology, its development, successes and tasks
N74-28597
Notes on the concept of normal values employed in
clinical practice
N74-28598

- Influence of a constant magnetic field on the fibrinogen-fibrin system N74-28616
- Effect of magnetic bracelets on the coagulation and anticoagulation systems of the blood of patients with hypertension N74-28618
- PLONSEY, R.**
An evaluation of several cardiac activation models A74-36905
- POLLACK, I.**
Detection of changes in spatial position. IV - Multiple display fields, display aiding, and interference A74-36751
- POLYAKOV, B. I.**
Peculiarities of the nystagmic reaction in human subjects after exposure to linear acceleration N74-28583
- PONOMAREVA, I. D.**
The development of an experimental human-operator sensory system A74-37011
- POPOV, V. I.**
Experimental data on the influence of irradiation of food products by protons and gamma radiation N74-28569
- POPP, R. L.**
An improved method for echographic detection of left atrial enlargement A74-36975
- POULTON, E. C.**
Interactions, range effects, and comparisons between tasks in experiments measuring performance with pairs of stresses - Mild heat and 1 mg of L-hyosine hydrobromide A74-36472
- PRAZDNIKOVA, N. V.**
Studies on visual pattern recognition in man and animals A74-37910
- PREDTECHENSKII, A. N.**
Effect of the psychophysiological properties of a pilot on the choice of the dynamic characteristics of an aircraft A74-36506
- PUCA, N.**
Some aspects of sound discomfort caused by streetcar traffic N74-28397
- PUKHOVA, Y. I.**
Characteristics of the immunological state of man during hypoxic hypoxia N74-28582
- PURSWELL, J. L.**
Study of control force limits for female pilots [AD-777839] N74-27585
- Q**
- QUINONES, M. A.**
Echocardiographic assessment of left ventricular function with special reference to normalized velocities A74-36974
- R**
- RADDATZ, H.**
The shock test, its problems at the present time and in the future A74-36689
- RADER, R. D.**
Renal parameter estimates in unrestrained dogs A74-37911
- RADKE, H.**
Method for measuring eye movements of pilots, exemplified for ILS approaches N74-28639
- RAPOPORT, S.**
To what extent is the glycolysis in mammalian erythrocytes carried out via 2,3 diphosphoglyceric acid? About a variant of the glycolytic cycle on the level of phosphoglyceric acids [RAF-LIB-TRANS-1724] N74-27545
- Nitrogen metabolism in erythrocyte maturation; residual nitrogen formation and hemoglobin synthesis [NASA-TT-P-15741] N74-27548
- RAYNAUD, J.**
Oxygen deficit and debt in submaximal exercise at sea level and high altitude A74-36213
- REDKO, V. I.**
Dosimetric investigations aboard the Salyut orbital space station N74-28568
- REHBE, H.**
Changes in the diurnal variations of simulated pilot activity after time shift due to air travel through several time zones [ESRO-TT-49] N74-28622
- REHUS, G. A.**
Vacuum distillation/vapor filtration water recovery [NASA-CR-120303] N74-28632
- RENNIE, D. W.**
Energetics of swimming in man A74-36208
- REUTOVA, M. B.**
Characteristics of the immunological state of man during hypoxic hypoxia N74-28582
- ROBINSON, D. H.**
The dangerous sky: A history of aviation medicine A74-36775
- ROGERS, D. B.**
G suit filling pressures determined by seat back angle A74-36476
- ROGOZKIN, V. D.**
Effectiveness of administration of amytravite and ATP during prolonged irradiation N74-28570
- ROSCOE, S. N.**
Man as a precious resource - The enhancement of human effectiveness in air transport operations A74-36323
- ROSENBERG, R. H.**
On electrophysiological activity of the normal heart A74-35673
- ROSENSTEIN, R.**
Influence of hypoxia on tidal volume response to CO₂ in decerebrate cats A74-37739
- ROSTORFER, E. H.**
Physiological adjustments to environmental factors [AD-777290] N74-27561
- ROTEBAUER, G.**
The optimization of control gain by self-adjustment A74-36658
- RUPP, S.**
Study of relations among the behavioral patterns, sociometric indices, and performance in pilot training at a commercial aviation school A74-37002
- RUTAN, A. H.**
Joint Army Navy air crew impact injury prevention program [AD-777713] N74-27582
- RYU, J. H.**
Progress in vestibular modeling A74-35250
- S**
- SAPRONOVA, V. G.**
Ultraviolet fluorescence of myeloid cells in the bone marrow of dogs exposed to chronic radiation N74-28588
- SAHB, D. J.**
Multiple crystal echocardiographic evaluation of endocardial cushion defect A74-36972
- SAITO, I.**
Relationship between susceptibility to motion sickness and tolerance to Coriolis forces A74-36656
- SAKAGUCHI, E.**
Changes in the plasma electrolyte levels of the rabbits during acute exposure to simulated high altitude A74-36652

- Effects of acute exposure to hypobaric hypoxia on water contents in the blood and several tissues in the rat
A74-36654
- SALTIN, B.
Hemodynamic and respiratory responses compared in swimming and running
A74-36214
- SALZANO, J.
Effect of high ambient pressure on human apneic bradycardia
A74-36220
- SCHAEFER, K. E.
Diffusional and metabolic components of nitrogen elimination through the lungs
A74-36211
- SCHOELZEL, P.
Nitrogen metabolism in erythrocyte maturation; residual nitrogen formation and hemoglobin synthesis
[NASA-TT-P-15741]
N74-27548
- SCHOULTZ, M. B.
Effect of motion frequency spectra on subjective comfort response
[REPT-403212]
N74-28630
- SCHUBERT, B.
A dynamic test method for investigations of electronic displays
N74-28636
- SCHUMANN, W.
Heart rate and energy-yielding substrates in blood during long-lasting running
A74-36398
- SCHWEIGER, B. G.
Nitrogen metabolism in erythrocyte maturation; residual nitrogen formation and hemoglobin synthesis
[NASA-TT-P-15741]
N74-27548
- SEARLE, R. G.
Effects of aircraft altitude and speed on air-to-ground visual target acquisition
A74-36474
- SEMENOV, L. N.
Method of magnetobiological indication in clinical laboratory practice
N74-28613
- SESTER, R. J.
Effects of background event rate and critical signal amplitude on vigilance performance
A74-37373
- SHADLEY, J.
Guidelines for a training course in noise survey techniques
[AD-776631]
N74-28645
- SHAKHOVICH, A. R.
Mathematical methods in the study of biological regulatory systems
A74-36130
- SHANNON, R. L.
Laboratory demonstration model: Active cleaning technique device
[NASA-CR-120292]
N74-28631
- SHAPIRO, D. I.
Mathematical methods in the study of biological regulatory systems
A74-36130
- SHAPIRO, Y.
Objective approach to a design of a whole-body, water-cooled suit
A74-36469
- SHASHKOV, V. S.
Effect of thyrocalcitonin on water-mineral metabolism in rabbits during prolonged restriction of mobility
N74-28572
- SHAW, D. B.
Cardiopulmonary function in prospective competitive swimmers and their parents
A74-36210
- SHILENKO, M. P.
Experiment with the incorporation of vegetable plants in a semiclosed life support system
N74-28576
- SHILOV, V. M.
Influence of functional loads on the state of the phagocytic function of blood in dogs subjected to chronic gamma-irradiation
N74-28592
- SHIMAMURA, K. K.
Perception of size at the detection threshold - Its accuracy and possible mechanisms
A74-37909
- SHIPOV, A. A.
Kinematic characteristics of motion of the human head in different planes
N74-28587
- SHIRAKI, S.
The analysis of aviation training evaluations. I - Effects of flying hours upon training evaluations
A74-36655
- SHUBROOKS, S. J., JR.
Physiologic responses to high sustained plusGz acceleration
[AD-777604]
N74-27559
- SHUSTOVA, V. M.
Man's mineral balance during ten-day confinement at a constant ambient temperature of 40 deg
N74-28584
- SHUTE, C. C. D.
Haidinger's brushes and predominant orientation of collagen in corneal stroma
A74-36421
- SHVARTZ, E.
Objective approach to a design of a whole-body, water-cooled suit
A74-36469
- SIDKO, F. Y.
Experiment with the incorporation of vegetable plants in a semiclosed life support system
N74-28576
- SIDOROV, IU. I.
Effect of the psychophysiological properties of a pilot on the choice of the dynamic characteristics of an aircraft
A74-36506
- Experimental investigation of the influence of loads of variable sign on pilot efficiency and passenger comfort
A74-36564
- SIMIC, D.
Contribution to the optimization of the oscillatory properties of a vehicle: Physiological foundations of comfort during oscillations
[RAE-LIB-TRANS-1707]
N74-27569
- SINELNIK, B. F.
The development of an experimental human-operator sensory system
A74-37011
- SIRBU, A.
Some aspects of sound discomfort caused by streetcar traffic
N74-28397
- SKOWRONSKI, V. D.
G suit filling pressures determined by seat back angle
A74-36476
- SMIDT, J. U.
Diffusional and metabolic components of nitrogen elimination through the lungs
A74-36211
- SMIRNOV, K. K.
Effect of thyrocalcitonin on water-mineral metabolism in rabbits during prolonged restriction of mobility
N74-28572
- SMIRNOV, K. V.
Effect of restricted motor activity on the enzyme secretion function of the pancreas and extrasecretory function of the liver in rats
N74-28573
- SMITH, A. M.
Tissue gases during hypovolemic shock
A74-36221
- SMITH, R. E.
Studies of peripheral circulatory rhythms in resting and exercising humans
A74-36228
- SMOLIKHINA, T. I.
Effect of cutting off the septal afferentia on acetylcholinesterase activity in the short-axon neurons of the hippocampus
A74-36936
- SOBNNISCHEN, N.
Studies on the detection of clinically silent involvement of muscle in lupus erythematosus
[NASA-TT-P-15804]
N74-28620

- SOLODOVNIK, P. A.
Tolerance to rotation with continuous and
intermittent head movements
[NASA-TT-F-15753] N74-27549
- SOBERSOW, M. L.
Oxygen effects on mortality of mice infected with
Diplococcus pneumoniae A74-36471
- SOSUNOV, A. V.
Method of magnetobiological indication in clinical
laboratory practice N74-28613
The protective effect of a constant magnetic field
N74-28615
- SPIVEY, D. L.
Helicopter flight investigation to determine the
effects of a closed-circuit TV on performance of
a precision sling-load handling task
[AHS PREPRINT 862] A74-36602
- SQUIRES, K. C.
Vertex evoked potentials in a rating-scale
detection task: Relation to signal probability
[NASA-CR-138796] N74-27573
- SQUIRES, M. K.
Vertex evoked potentials in a rating-scale
detection task: Relation to signal probability
[NASA-CR-138796] N74-27573
- STEIN, E. M.
Hemodynamic and respiratory responses compared in
swimming and running A74-36214
- STEIN, W.
Investigation methods for manual control processes
A74-36659
- STEININGER, K.
Study of relations among the behavioral patterns,
sociometric indices, and performance in pilot
training at a commercial aviation school
A74-37002
- STEKOLNIKOV, L. I.
Effect of thyrocalcitonin on water-mineral
metabolism in rabbits during prolonged
restriction of mobility N74-28572
- STEPANOV, A. S.
Dosimetric investigations aboard the Salyut
orbital space station N74-28568
- STEVENS, C. M.
Renal parameter estimates in unrestrained dogs
A74-37911
- STITH, J. A.
Observations on saccules of rats exposed to
long-term hypergravity A74-36468
- STOCKWELL, C. W.
Observations on saccules of rats exposed to
long-term hypergravity A74-36468
- STONE, D. L.
Evaluation of intratracheal cuffs for aeromedical
evacuation [AD-776319] N74-28646
- STONER, G. E.
Microbial detection method based on sensing
molecular hydrogen A74-36374
- STRASSER, H.
Comparative investigations of the learning process
in tracking tests of constant or quasi-constant
and self-adapting difficulty level. I - Middle
learning level - Reliability - Antagonism
learning/fatigue. II - Differential diagnostic
parameters - Relevant or irrelevant additional
signals A74-36399
- STROMBEYER, C. F., III
Form-specific colour after effects in scotopic
illumination A74-37047
- STROSSER, M. T.
Effect of heat on growth hormone secretion and
adrenal cortex activity in rats A74-36363
- STROTHER, D. D.
Visual and manual workload of the helicopter pilot
[AHS PREPRINT 921] A74-36625
- SUGAWARA, H.
Relationship between susceptibility to motion
sickness and tolerance to Coriolis forces
A74-36656
- SUMAROVKOV, D. D.
Effect of thyrocalcitonin on water-mineral
metabolism in rabbits during prolonged
restriction of mobility N74-28572
- SUVOROV, P. M.
Prediction of acceleration tolerance by means of a
decompression functioning test A74-37532
Study of the possibility of use of decompression
of the lower body in diagnosis of body
predisposition to a syncopal state N74-28581
- SWORD, A. J.
Study to design and develop remote manipulator
system [NASA-CR-137528] N74-27571
- SYROTSKIY, V. V.
Cardiac rhythm computer analysis techniques
[NASA-TT-F-15733] N74-27574
- T**
- TAYLOR, R. M.
Human factors principles in map design
A74-37008
- TENNEY, S. M.
A theoretical analysis of the relationship between
venous blood and mean tissue oxygen pressures
A74-37741
- TERRY, R. W.
Multiple crystal echocardiographic evaluation of
endocardial cushion defect A74-36972
- TERSKOV, I. A.
Experiment with the incorporation of vegetable
plants in a semiclosed life support system
N74-28576
- THIRY, P. S.
On electrophysiological activity of the normal heart
A74-35673
- THOMAS, J.
Layout and performance of anthropotechnical
experiments, exemplified by a flight simulator
investigation N74-28637
- THOMAS, J. P.
Perception of size at the detection threshold -
Its accuracy and possible mechanisms A74-37909
- THOMPSON, R. L.
Psychological factors related to the voluntary use
of hearing protection in hazardous noise
environments [AD-777520] N74-27579
- THORMANN, T.
Studies on the detection of clinically silent
involvement of muscle in lupus erythematosus
[NASA-TT-P-15804] N74-28620
- THORN, F.
Human binocular summation at absolute threshold
A74-37907
- THORPE, R. W.
Joint Army Navy air crew impact injury prevention
program [AD-777713] N74-27582
- TIKHOMIROVA, M. V.
Effectiveness of administration of amytravite
and ATP during prolonged irradiation N74-28570
- TILLOUS, M. C.
Oxygen deficit and debt in submaximal exercise at
sea level and high altitude A74-36213
- TINBAL, J.
Determination of the zone of thermal neutrality in
water [RAE-LIB-TRANS-1704] N74-27546
- TOHESCU, C.
Data on the acoustic comfort of passengers in
railroad cars and soundproofing recommendations
N74-28398

- TOTSKIY, V. N.**
Effects of vitamins on the penetration of
lipoate-S sup 35 into the cells of animals
subjected to acceleration
N74-28589
- TRIPUZOV, A. N.**
The protective effect of a constant magnetic field
N74-28615
- TSYGANOVA, N. I.**
Characteristics of the immunological state of man
during hypoxic hypoxia
N74-28582
- TURLEJSKA-STELMASIAK, E.**
The influence of dehydration on heat dissipation
mechanisms in the rabbit
A74-36358
- TURNER, J. H.**
Variability of maximum expiratory flow-volume curves
A74-36216

U

- UDOVENKO, B. F.**
Long term effect on high vacuum on microorganisms
[NASA-TT-F-15720]
N74-28564
- URSONIU, C.**
Some aspects of sound discomfort caused by
streetcar traffic
N74-28397
- USKOV, P. N.**
Psychopharmacological regulation of
interpersonality relationships in a group
(experimental investigation)
N74-28578

V

- VALENTINE, L. D., JR.**
Validation of two aircrew psychomotor tests
[AD-777830]
N74-28642
- VAN DER MAAS, H.**
Achievement motivation in pilots-selection
A74-37005
- VAN HAASBERT, J. S.**
All-exotic materials used in NASA's Skylab/Space
Shuttle crews' bump protective helmets
A74-35839
- VANPELT, W. F.**
A review of selected bioeffects thresholds for
various spectral ranges of light
[PB-226391/9]
N74-27563
- VARTBARONOV, R. A.**
Prediction of acceleration tolerance by means of a
decompression functioning test
A74-37532
- VASHUK, A. A.**
Thermal tolerance of blood serum in dogs subjected
to combined exposure to X-radiation and reduced
barometric pressure
N74-28594
- VERPILLAT, J. M.**
Reaction of the resistive and capacitive vessels
of the hand at the start of muscular exercise
A74-36360
- VETROV, O. P.**
Cardiac rhythm computer analysis techniques
[NASA-TT-F-15733]
N74-27574
- VIDRUK, E.**
Evidence of altered regulation of ventilation
during exposure to hypoxia
A74-37742
- VILYANS, M. V.**
Peculiarities of the chemical composition of green
plants during their prolonged cultivation on an
ionite substrate
N74-28577
- VINOGRADOVA, O. S.**
Effect of cutting off the septal afferentia on
acetylcholinesterase activity in the short-axon
neurons of the hippocampus
A74-36936
- VIROVETS, O. A.**
Man's mineral balance during ten-day confinement
at a constant ambient temperature of 40 deg
N74-28584
- VITENSON, T. M.**
Changes in the fibrinogen-fibrin system following
a 20-hour exposure of rabbits to a magnetic field
N74-28617

- VLASOVA, T. F.**
Investigation of assimilability of amino acids by
man receiving an amino acid mixture
N74-28586
- VODYAKOVA, L. E.**
Effectiveness of administration of amytravite
and ATP during prolonged irradiation
N74-28570
- VOGT, L. E.**
Impedance measurements for the development of a
nonlinear model of supine man
A74-36685
- VOLOSHIN, V. G.**
Prediction of acceleration tolerance by means of a
decompression functioning test
A74-37532
- VOLOZHIN, A. I.**
Effect of thyrocalcitonin on water-mineral
metabolism in rabbits during prolonged
restriction of mobility
N74-28572
- VON DOBELN, W.**
Body composition, sinking force, and oxygen uptake
of man treading water
A74-36215
- VON NIERDING, G.**
Diffusional and metabolic components of nitrogen
elimination through the lungs
A74-36211
- VRASTI, R.**
Data on the acoustic comfort of passengers in
railroad cars and soundproofing recommendations
N74-28398
- VYAZITSKIY, P. O.**
The effect of three day hypodynamia on liver
function
[NASA-TT-F-15646]
N74-28566
- VYSOTSKIY, V. G.**
Investigation of assimilability of amino acids by
man receiving an amino acid mixture
N74-28586

W

- WADA, O.**
Diseases due to pollutions
[APTIC-41124]
N74-27552
- WAGSTAFF, A. E.**
Clinical problems and stress in air traffic control
A74-35700
- WALKER, J. T.**
Lythgoe's visual stereophenomenon in the natural
environment - A possible factor in air and
highway accidents
A74-36753
- WALKINSHAW, C. E.**
Fine structure of tannin accumulations in callus
cultures of Pinus elliotti /slash pine/
A74-36195
- WANNER, H. U.**
Studies on room ozonizers and on ozone occurrence
in the outside air and in industrial plants
[APTIC-07834]
N74-27551
- WARM, J. S.**
Effects of background event rate and critical
signal amplitude on vigilance performance
A74-37373
- WEBB, W. B.**
Regularity in the control of the free-running
sleep-wakefulness rhythm
A74-36467
- WEISHAUP, G.**
Studies on the detection of clinically silent
involvement of muscle in lupus erythematosus
[NASA-TT-F-15804]
N74-28620
- WEISS, H. S.**
Oxygen effects on mortality of mice infected with
Diplococcus pneumoniae
A74-36471
- WENDHAUSEN, R. W.**
Some NASA contributions to human factors
engineering: A survey
[NASA-SP-5117]
N74-28633
- WHARF, J.**
The format and color of small matrix displays for
use in high ambient illumination
A74-35565

WHITNEY, R. U.
G suit filling pressures determined by seat back angle
A74-36476

WIEGAND, D.
The effect of stochastic /mechanical/ vibrations on physiological and psychological functions and on subjective perception
A74-37075

WILKINS, J. R.
Microbial detection method based on sensing molecular hydrogen
A74-36374

WILSON, D. W.
Energetics of swimming in man
A74-36208

WILSON, E. P.
Women commercial pilots
A74-37001

WILSON, R. V.
Display collimation under whole-body vibration
A74-36755

WILT, S. M.
Detection of hypokinesia by a quantitative analysis of left ventricular cineangiograms
A74-36979

WINN, A. L.
Pilot workload during instrument flight [AHS PREPRINT 820]
A74-36624

WOOD, L.
Effect of inspiratory flow rate on regional distribution of inspired gas
A74-36209

WOOD, H. E.
Transfer from audiovisual pretraining to a continuous perceptual motor task [AD-778078]
N74-28647

WOODWELL, G. M.
Carbon and the biosphere [CONP-720510]
N74-28621

WULPECK, J. W.
Transfer of training from predictor to conventional displays [AD-777171]
N74-28644

WURTMAN, R. J.
Brain catechol synthesis - Control by brain tyrosine concentration
A74-35335

Y

YAGODINSKIY, V. N.
Results of comparison of the dynamics of the epidemic process with changes in the planetary index of magnetic disturbance
N74-28603

The problem of the periodicity of the epidemic process
N74-28604

Statistical evaluation of the significance of the influence of abrupt changes in solar activity on the dynamics of the epidemic process
N74-28605

YAGUNOV, A. S.
Ultraviolet fluorescence of myeloid cells in the bone marrow of dogs exposed to chronic radiation
N74-28588

YAKOVLEVA, I. Y.
Expert evaluation of the state of the nasal sinuses in cosmonaut candidates
N74-28579

YAHARA, T.
Changes in the plasma electrolyte levels of the rabbits during acute exposure to simulated high altitude
A74-36652

YEGOROV, B. B.
Effect of thyrocalcitonin on water-mineral metabolism in rabbits during prolonged restriction of mobility
N74-28572

YEPISHINA, S. G.
Change in blood coagulation indices as a function of the incubation period of plasma in a constant magnetic field
N74-28610

Change in fibrinolytic activity under the influence of a constant magnetic field
N74-28611

YOKOYAMA, E.
A comparison of the effects of SO₂, NO₂ and O₃ on the pulmonary ventilation: Guinea pig exposure experiments [APTIC-15680]
N74-28559

YURGOV, V. V.
Experimental data on the influence of irradiation of food products by protons and gamma radiation
N74-28569

YURUGI, R.
Changes in the plasma electrolyte levels of the rabbits during acute exposure to simulated high altitude
A74-36652

Z

ZABRODINA, L. V.
Effect of a magnetic field of extremely low intensity on the coagulatory system of the blood
N74-28607

The influence of a constant magnetic field on the coagulatory system of the blood in an experiment
N74-28608

Repeated action of a constant magnetic field on the blood coagulation system in artificially produced anemia
N74-28609

Effect of magnetic bracelets on the coagulation and anticoagulation systems of the blood of patients with hypertension
N74-28618

ZELIS, R.
A comparison of regional blood flow and oxygen utilization during dynamic forearm exercise in normal subjects and patients with congestive heart failure
A74-36980

ZHERNAVKOV, V. P.
Experimental investigation of the influence of loads of variable sign on pilot efficiency and passenger comfort
A74-36564

ZHUKOV, V. N.
Effect of imipranine, nitrazepam and sodium hydroxybutyrate on sleep impairments caused by emotional stress
N74-28575

ZIEGLER, E. C.
Tissue gases during hypovolemic shock
A74-36221

ZNAMENSKAIA, A. N.
The generalization function in monkeys - Physiological aspect
A74-37325